



*CPU Cards*

# CZGA LX-50

**PISA Single-Board Computer with  
Audio, VGA, TTL LCD, LVDS, Dual LAN,  
Dual SATA & Serial**



## **USER'S MANUAL**

**VER. 2.1C • JUN 2009**

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| CZGA LX-50 |             |                                |
|------------|-------------|--------------------------------|
| Revision # | Description | Date of Issue                  |
| 1.10       | Revision    | December 2007                  |
| 2.0C       | Revision    | November 15 <sup>th</sup> 2008 |
| 2.1C       | Revision    | June 14, 2009                  |

# Manual Conventions

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## **WARNING!**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word “warning” is written as “**WARNING**,” both capitalized and bold and is followed by text. The text is the warning message. A warning message is shown below:



## **WARNING:**

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the CZGA LX-50 or personal injury to the user. Please take warning messages seriously.

---



## **CAUTION!**

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the CZGA LX-50. Cautions are easy to recognize. The word “caution” is written as “**CAUTION**,” both capitalized and bold and is followed. The italicized text is the cautionary message. A caution message is shown below:

**CAUTION:**

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the CZGA LX-50. Please take caution messages seriously.

**NOTE:**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes. Notes are easy to recognize. The word “note” is written as “**NOTE**,” both capitalized and bold and is followed by text. The text is the cautionary message. A note message is shown below:

**NOTE:**

This is an example of a note message. Notes should always be read. Notes contain critical information about the CZGA LX-50. Please take note messages seriously.

---

# Packing List

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**NOTE:**

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact CyberResearch, Inc. via phone or send an email to [sales@cyberresearch.com](mailto:sales@cyberresearch.com)

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The items listed below should all be included in the CZGA LX-50 package.

- 1 x CZGA LX-50 single board computer
- 1 x Mini jumper pack
- 1 x ATA66/100 flat cable
- 2 x SATA cables
- 1 x SATA power cable
- 1 x Single RS-232 cable
- 1 x KB/MS Y cable
- 1 x USB cable
- 1 x Audio cable
- 1 x Utility CD

Images of the above items are shown in **Chapter 3**.

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Chapter

1

# Introduction

---

## 1.1 CZGA LX-50 CPU Card Overview



**Figure 1-1: CZGA LX-50 CPU Card**

The half-size CZGA LX-50 CPU card is preinstalled with a 500 MHz AMD Geode™ LX 800 CPU. This half-size platform provides support for multiple display types including VGA, 18-bit LVDS and 24-bit TTL displays. Comprehensive external I/O connectors include a PS/2 connector, a USB 2.0 port and dual RJ-45 connectors for dual 10/100 Mbps Ethernet connectivity, and a VGA display connector.

Two internal serial ports and two additional internal USB 2.0 ports provide further I/O connectivity to the CZGA LX-50 platform.

Diversified storage capabilities add additional flexible operational capacity to the CZGA LX-50. Two IDE hard disk drives (HDD), one floppy disk drive (FDD) and two serial ATA (SATA) HDD are interfaced through the onboard connectors.

### 1.1.1 CZGA LX-50 Applications

The CZGA LX-50 is designed for applications in the following areas:

- Industrial PC applications
- Human Machine Interface (HMI) applications
- Marine, GPS and transportation applications

- Financial, retail and kiosk applications

### 1.1.2 CZGA LX-50 Benefits

Some of the CZGA LX-50 benefits include:

- Low power, high performance
- Multiple storage option integration including
  - 40-pin IFM or 3.5" HDD
  - 34-pin floppy disk drive (FDD) support
  - Dual SATA ports with ALI M5283 RAID 0 and RAID 1 support

### 1.1.3 CZGA LX-50 Features

Some of the CZGA LX-50 features are listed below:

- Complies with PCISA form factor
- Complies with RoHS
- Contains an embedded 500 MHz AMD Geode™ LX 800 CPU
- Supports a DDR 333 MHz or 400 MHz DIMM with a maximum capacity of 1GB
- Supports CRT, 24-bit TTL/18-bit LVDS displays
- Supports IDE, dual LAN, five USB 2.0 devices, one RS-232 serial port connector, and one RS-232/422/485 serial port connector
- Comes with two high performance 10/100 Mbps Ethernet controllers
- Supports two SATA channels with transfer rates up to 1.5 Gbps

## 1.2 CZGA LX-50 Overview

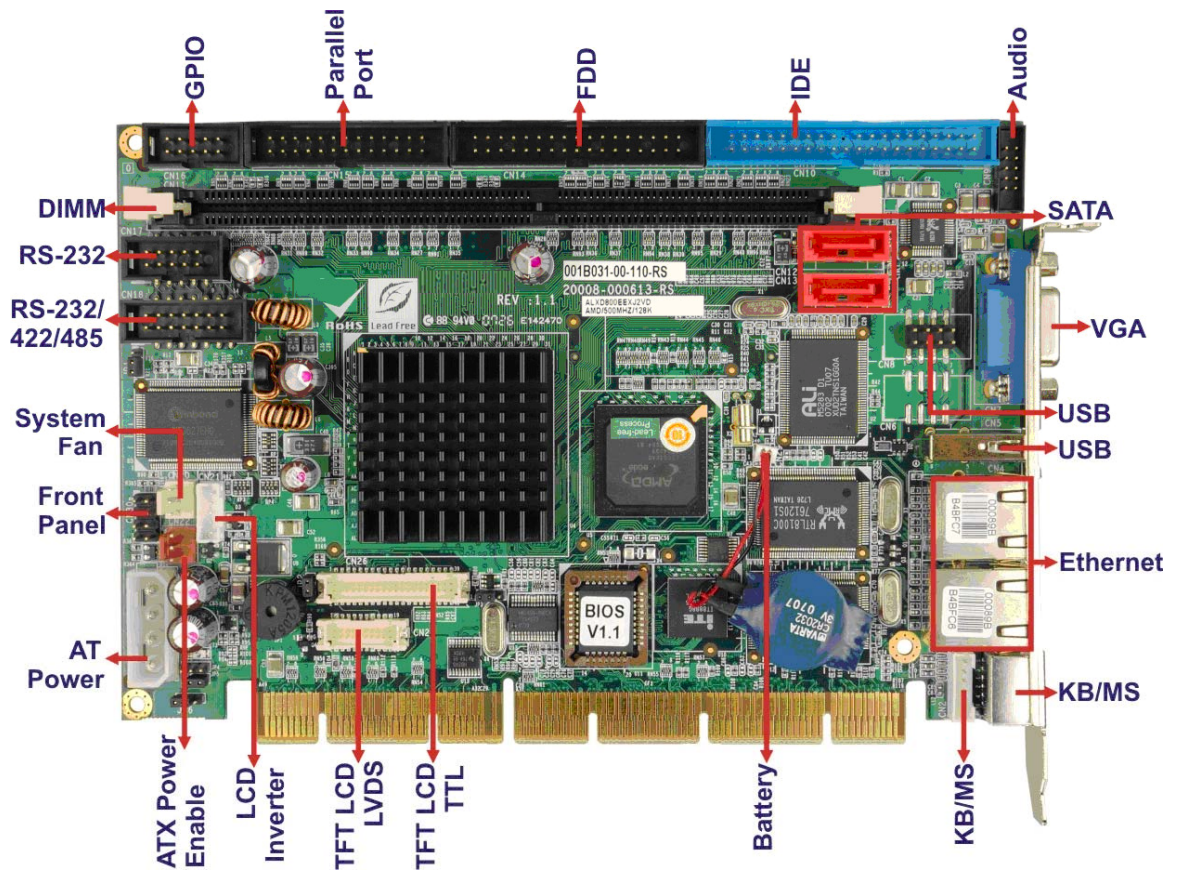


Figure 1-2: CZGA LX-50 Overview



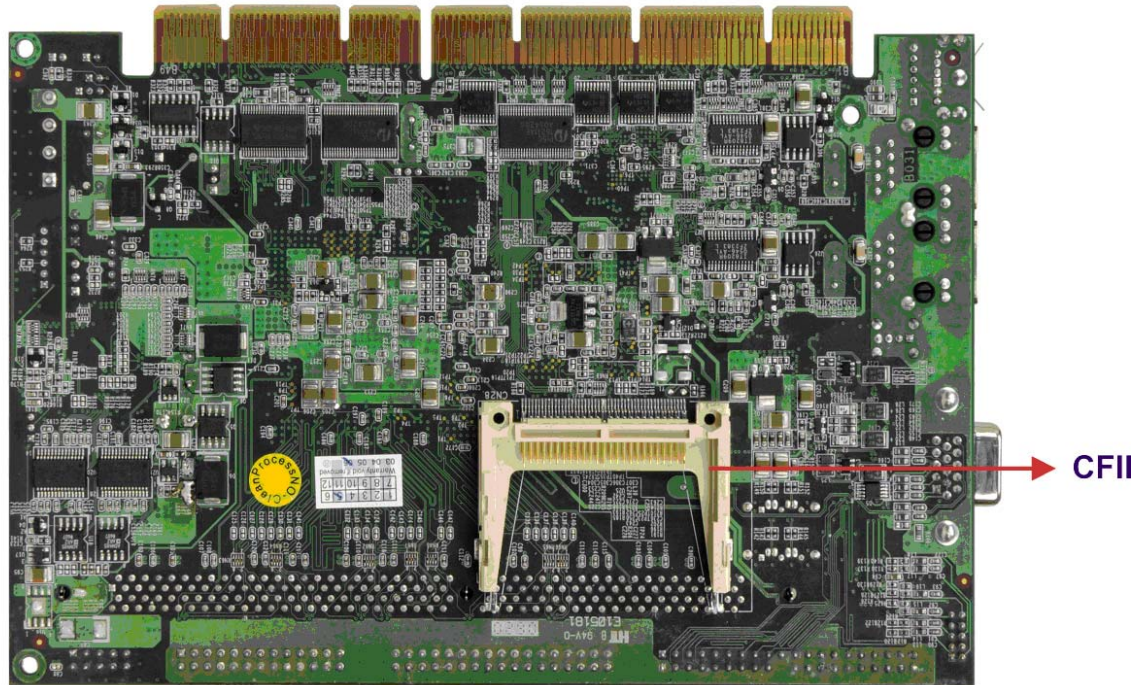


Figure 1-3: CZGA LX-50 Solder Side Overview

### 1.2.1 CZGA LX-50 Connectors

The CZGA LX-50 has the following connectors onboard:

- 1 x 184-pin DDR DIMM socket
- 1 x AT power connector
- 1 x ATX power supply enable connector
- 1 x Audio connector
- 1 x Battery connector
- 1 x CompactFlash® card socket
- 1 x Floppy disk connector
- 1 x Front panel connector
- 1 x GPIO connector
- 1 x IDE Interface connector
- 1 x Keyboard/mouse connector
- 1 x LCD inverter power connector

- 1 x LCD LVDS interface connector
- 1 x LCD TTL interface connector
- 1 x Parallel port connector
- 1 x RS-232 serial port connector
- 1 x RS-232/422/485 serial port connector
- 1 x System fan connector
- 2 x SATA connectors
- 1 x USB connector

The CZGA LX-50 has the following external peripheral interface connectors:

- 2 x Ethernet connectors
- 1 x PS/2 keyboard/mouse connector
- 1 x USB connector
- 1 x VGA connector

The CZGA LX-50 has the following onboard jumpers:

- AT/ATX power mode select
- CF card select
- COM2 RS-422/485 select
- LCD voltage select
- LCD clock select
- PCI VIO voltage select

The location of these connectors on the CPU card can be seen in **Figure 1-2**. These connectors are fully described in **Chapter 4**.

### 1.2.2 Technical Specifications

CZGA LX-50 technical specifications are listed in **Table 1-1**. Detailed descriptions of each specification can be found in **Chapter 2**.

| SPECIFICATION | DESCRIPTION               |
|---------------|---------------------------|
| CPU Supported | 500 MHz AMD Geode™ LX 800 |

| SPECIFICATION                  | DESCRIPTION  |
|--------------------------------|--|
| <b>Cache Memory</b>            | 64K I/ 64k D L1 cache, 128K L2 cache   |
| <b>I/O Controller</b>          | AMD CS5536   |
| <b>Memory</b>                  | One 184-pin 1 GB (max.) 333/400 MHz DDR DIMM   |
| <b>Digital I/O</b>             | 8-bit digital I/O, 4 input / 4output by super I/O  |
| <b>Super I/O</b>               | Winbond W83627EHG  |
| <b>LVDS</b>                    | Single-channel 18-bit LVDS integrated in AMD Geode™ LX 800                                 |
| <b>TTL</b>                     | 24-bit TTL integrated in AMD Geode™ LX 800   |
| <b>HDD Interface</b>           | One IDE channel supports two Ultra ATA 100/66/33 devices                                   |
| <b>Power Support</b>           | 5V/12V AT power support  |
| <b>Power Consumption</b>       | 5V @ 1.094A, +12V @ 0.07A<br>(AMD Geode LX 800 CPU with a 256 MB 400 MHz HCT11.2 DDR DIMM) |
| <b>Power Management</b>        | Supports Advanced Configuration and Power Interface (ACPI) Specifications Revision 2.0     |
| <b>Watchdog Timer</b>          | Software programmable supports<br>1~255 sec. system reset                                  |
| <b>Serial ATA (SATA)</b>       | Two SATA channels with 1.5 Gbps transfer rates<br>Supports RAID 0, 1 with ALI M5283        |
| <b>Floppy Disk Drive (FDD)</b> | Supports one FDD   |
| <b>SSD</b>                     | CompactFlash® (CF) Type II   |
| <b>USB Interfaces</b>          | Support five USB 2.0 devices   |

| SPECIFICATION         | DESCRIPTION  |
|-----------------------|--|
| Serial Ports          | One RS-232 COM port<br>One RS-232/422/485 COM port |
| Audio Interface       | Realtek ALC203 with AC `97 codec                   |
| Real Time Clock       | 256-byte battery backed CMOS RAM                   |
| Hardware Monitoring   | CPU temperature and system voltages                |
| Ethernet              | Dual 10/100BASE-T Realtek RTL8100C chipsets        |
| BIOS                  | AWARD  |
| Physical Dimensions   | 185 mm x 127.6 mm                                  |
| Operating Temperature | Minimum: 0°C (32°F) - Maximum: 60°C (140°F)        |
| Operating Humidity    | Minimum: 5% - Maximum: 95% non-condensing          |
| Weight                | GW: 1.0 kg   |

Table 1-1: Technical Specifications

Chapter

2

# Detailed Specifications

---

## 2.1 Overview

This chapter describes the specifications and on-board features of the CZGA LX-50 in detail.

## 2.2 Dimensions

### 2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length:** 185.0 mm
- **Width:** 127.6 mm

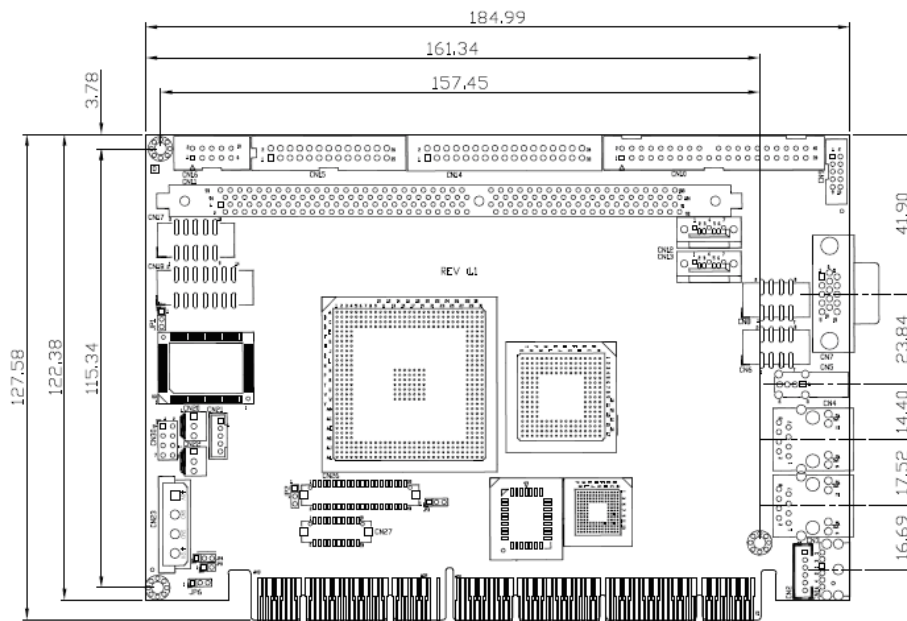
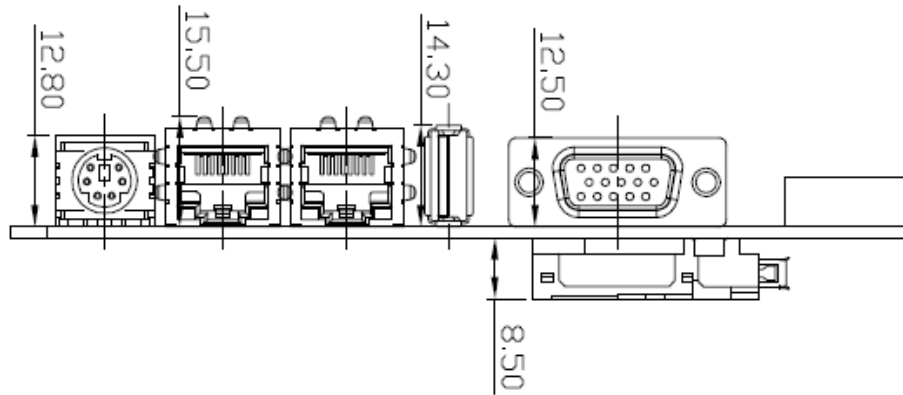


Figure 2-1: CZGA LX-50 Dimensions (mm)

### 2.2.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.



**Figure 2-2: External Interface Panel Dimensions (mm)**

## 2.3 Data Flow

The CZGA LX-50 motherboard comes with an AMD® Geode™ LX 800 CPU and an AMD® Geode™ CS5536 linked together by the GeodeLink™ Interface Unit. **Figure 2-3** shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

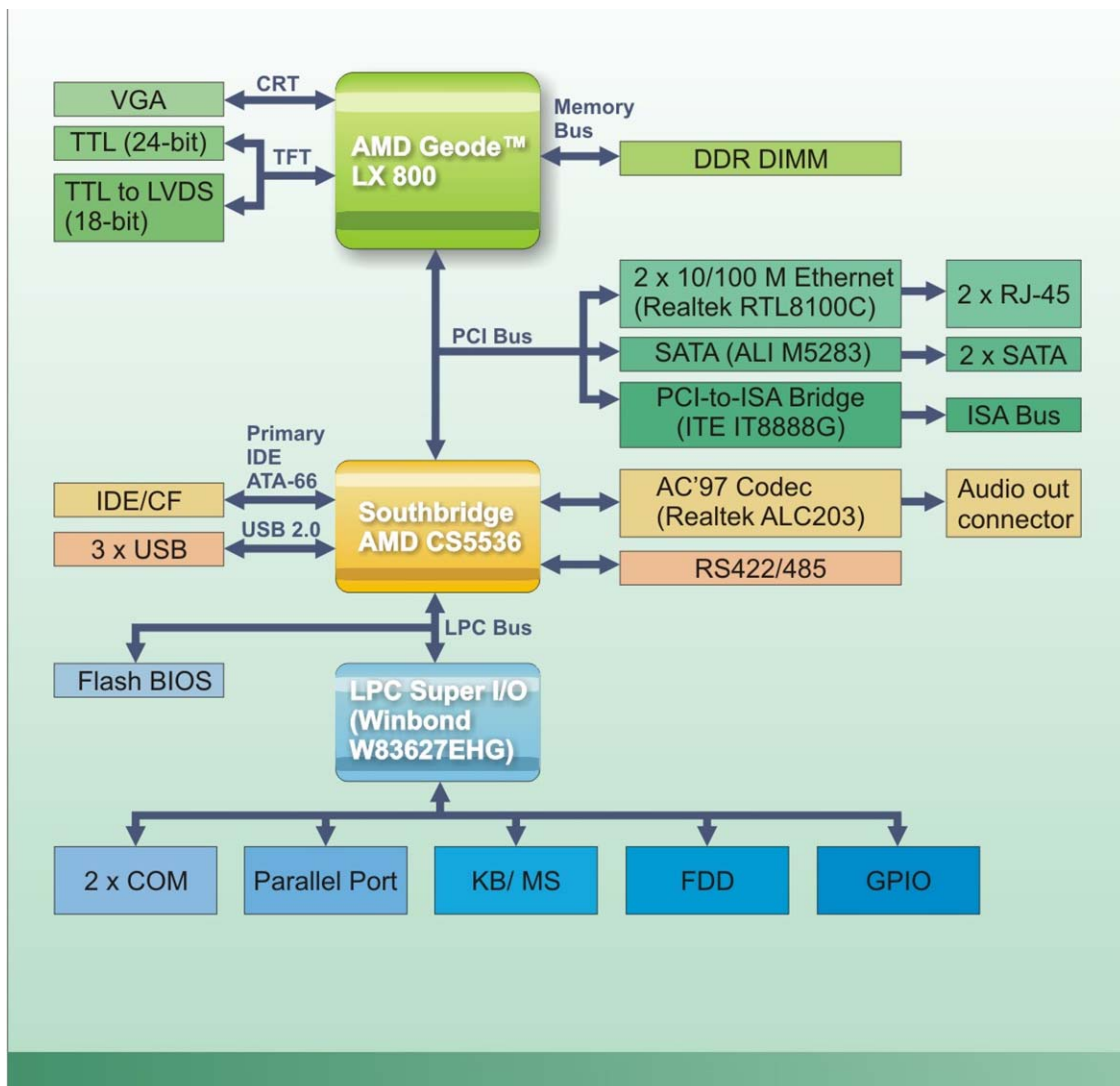


Figure 2-3: Data Flow Block Diagram

## 2.4 CPU Support

The CZGA LX-50 series motherboards all come with a preinstalled 500MHz AMD Geode™ LX 800 CPU.

### 2.4.1 AMD Geode™ LX 800 Overview

The specifications for the 500 MHz AMD Geode™ LX 800 are listed below

- x86/x87-compatible core



- Processor frequency up to 500 MHz
- 64K I/64K D L1 cache and 128K L2 cache
- Split I/D cache/TLB (Translation Look-Aside Buffer)
- Integrated FPU that supports the Intel MMX® and AMD 3DNow!™ Technology instruction sets
- 9 GB/s internal GeodeLink™ Interface Unit (GLIU)
- Security Block
  - 128-bit AES (CBC/ECB)
- True Random Number Generator

## 2.4.2 AMD Geode™ LX 800 Memory Support

The AMD Geode™ LX 800 processor is interfaced to one 184-pin DDR DIMM connector through a 64-bit bus. A 400 MHz or 333 MHz 184-pin DIMM with a maximum capacity of 1GB can be installed in the DIMM socket.

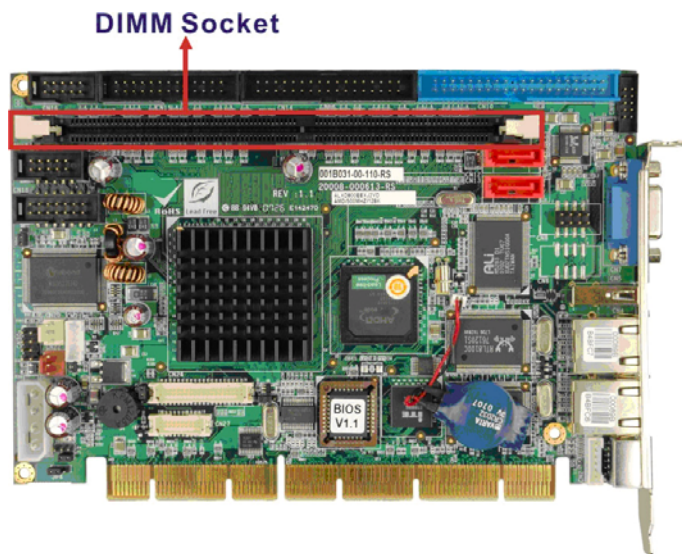


Figure 2-4: DIMM Socket

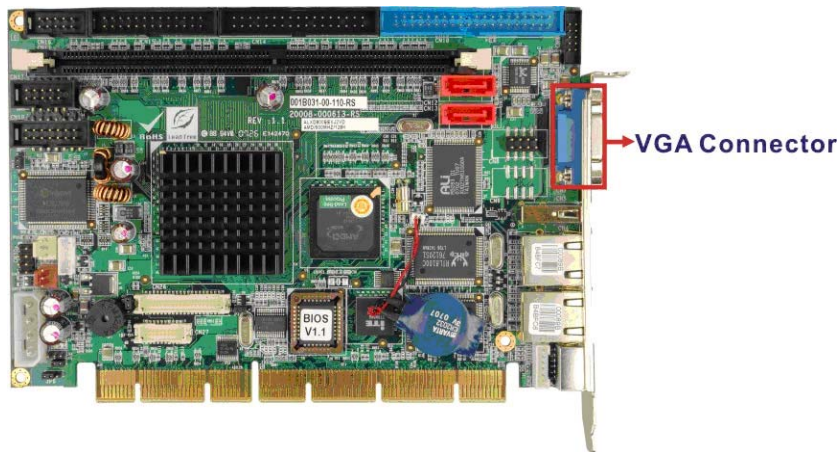
### 2.4.3 AMD Geode™ LX 800 Display Support

AMD Geode™ LX 800 processor supports the following display options:

- 24-bit TTL displays
- VGA displays
- 18-bit single-channel LVDS displays

#### 2.4.3.1 VGA Connectivity

As described in **Chapter 1**, the CZGA LX-50 comes with a standard VGA interface connector. VGA graphics are already integrated in the AMD Geode™ LX 800 CPU.



**Figure 2-5: VGA Connector**

#### 2.4.3.2 TTL Display Support

24-bit TTL displays are also supported by the AMD Geode™ LX 800 CPU. The TTL displays are interfaced to the CPU through a 40-pin crimp connector.

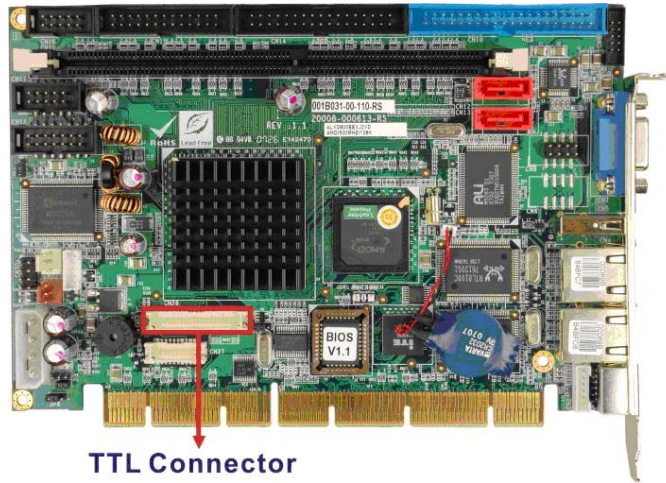


Figure 2-6: TTL Connector

### 2.4.3.3 LVDS Displays Support

The AMD Geode™ LX 800 CPU supports 18-bit single-channel LVDS displays. The LVDS displays are interfaced to the CPU through a 20-pin crimp connector.

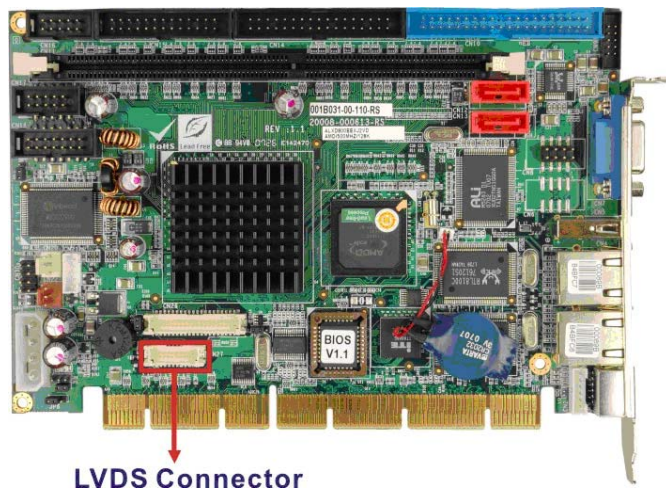


Figure 2-7: LVDS Connector

### 2.4.4 AMD Geode™ LX 800 Graphics processor

The AMD Geode™ LX 800 BitBLT/vector engine graphics processor supports pattern generation, source expansion, pattern/source transparency, 256 ternary raster operations, alpha blenders to support alpha- BLTs, incorporated BLT FIFOs, a GeodeLink interface and the ability to throttle BLTs according to video timing. New features added to the Graphics Processor include:

- Command buffer interface
- Hardware accelerated rotation BLTs
- Color depth conversion
- Paletized color
- Full 8x8 color pattern buffer
- Separate base addresses for all channels
- Monochrome inversion

**Table 2-1: Geode LX Graphics Features** lists a complete list of Geode LX graphics features. For more details, please refer to the AMD website or the Geode LX series data book available from AMD.

| Feature                                  | AMD Geode™ LX Processor                   |
|--|---|
| Color Depth                              | 8, 16, 32 bpp (A) RGB 4 and 8-bit indexed |
| ROPs                                     | 256 (2-src, dest and pattern)             |
| BLT Buffers                              | FIFOs in Graphics Processor               |
| BLT Splitting                            | Managed by hardware                       |
| Video Synchronized BLT/Vector            | Throttle by VBLANK                        |
| Bresenham Lines                          | Yes                                       |
| Patterned (stippled) Lines               | Yes                                       |
| Screen to Screen BLT                     | Yes                                       |
| Screen to Screen BLT with mono expansion | Yes                                       |
| Memory to Screen BLT                     | Yes (throttled rep movs writes)           |
| Accelerated Text                         | No  |
| Pattern Size (Mono)                      | 8x8 pixels                                |
| Pattern Size (Color)                     | 8x8 pixels                                |

|                               |  |
|-------------------------------|--|
| Monochrome Pattern            | Yes (with inversion)   |
| Dithered Pattern (4 color)    | No   |
| Color Pattern                 | 8, 16, 32 bpp  |
| Transparent Pattern           | Monochrome   |
| Solid Fill                    | Yes  |
| Pattern Fill                  | Yes  |
| Transparent Source            | Monochrome   |
| Color Key Source Transparency | Y with mask  |
| Variable Source Stride        | Yes  |
| Variable Destination Stride   | Yes  |
| Destination Write Bursting    | Yes  |
| Selectable BLT Direction      | Vertical and Horizontal  |
| Alpha BLT                     | Yes (constant $\alpha$ , $\alpha/\text{pix}$ , or sep. $\alpha$ channel) |
| VGA Support                   | Decodes VGA Register   |
| Pipeline Depth                | Unlimited  |
| Accelerated Rotation BLT      | 8, 16, 32 bpp  |
| Color Depth Conversion        | 5:6:5, 1:5:5:5, 4:4:4:4, 8:8:8:8   |

**Table 2-1: Geode LX Graphics Features**

### 2.4.5 AMD Geode™ LX 800 Power Management

The power management for the 500 MHz AMD Geode™ LX 800 is listed below:

- 1.8W Typical (3.9W TDP) @ 500MHz
- GeodeLink active hardware power management
- Hardware support for standard ACPI software power management
- I/O companion SUSP#/SUSPA# power controls
- Lower power I/O
- Wakeup on SMI/INTR

## 2.5 System Chipset

The CZGA LX-50 series motherboards all have a preinstalled AMD Geode™ CS5536 system chipset. The system chipset features are listed below.

- 82xx Legacy Devices
- System Management Bus (SMB) Controller
- 8 Multi-Function General Purpose Timers (MFGPTs)
- Power Management Controller
- ACPI v2.0 compliant

### 2.5.1 GeodeLink™ Interface Unit

- 64-bit, 66MHz operation
- PCI VSM (Virtual System Module) that makes the interface transparent to applications software and BIOS
- Programmable routing descriptors, use and activity monitors, and SSMI (Synchronous System Management Interrupt)

### 2.5.2 AMD Geode™ CS5536 ATA-6 Controller

The single CZGA LX-50 IDE connector supports two ATA-6 HDDs. An ATA-6 (Ultra ATA/100) compliant IDE controller on the AMD Geode™ CS5536 has a maximum transfer rate of 100MB/s. ATA-6 includes advancements in error checking and ATA-6 drives are compatible with future interface additions.

The onboard ATA-6 controller is able to support the following IDE HDDs:

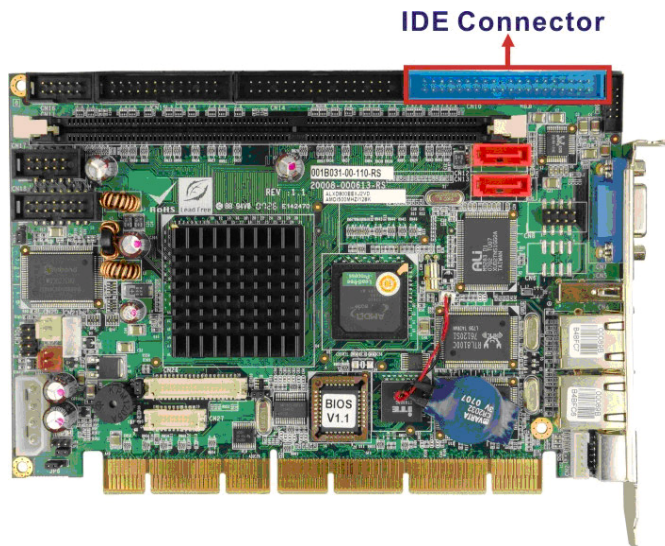
- **Ultra ATA/100**, with data transfer rates up to 100MB/s
- **Ultra ATA/66**, with data transfer rates up to 66MB/s
- **Ultra ATA/33**, with data transfer rates up to 33MB/s

| Specification                | Ultra ATA/100 | Ultra ATA/66 | Ultra ATA/33 |
|------------------------------|---------------|--------------|--------------|
| <b>IDE devices</b>           | 2             | 2            | 2            |
| <b>PIO Mode</b>              | 0 – 4         | 0 – 4        | 0 – 4        |
| <b>PIO Max Transfer Rate</b> | 16.6 MB/s     | 16.6 MB/s    | 16.6 MB/s    |
| <b>DMA/UDMA designation</b>  | UDMA 3 - 4    | UDMA 3 – 4   | UDMA 2       |
| <b>DMA/UDMA Max Transfer</b> | 100MB/s       | 66MB/s       | 33MB/s       |

|                             |    |    |    |
|-----------------------------|----|----|----|
| <b>Controller Interface</b> | 5V | 5V | 5V |
|-----------------------------|----|----|----|

**Table 2-2: Supported HDD Specifications**

The two drives can be interfaced to the Southbridge through the box connector.

**Figure 2-8: IDE Connectors**

### 2.5.3 AMD Geode™ CS5536 Audio Codec 97 (AC'97) Controller

The AC'97 specification v2.3 compliant controller on the chipset is interfaced to a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 stereo Realtek ALC203 codec. The ALC203 is then connected to a 10-pin audio connector to which an audio kit can easily be connected. The codec meets performance requirements for audio on PC99/2001 systems. Some of the codec features are listed below.

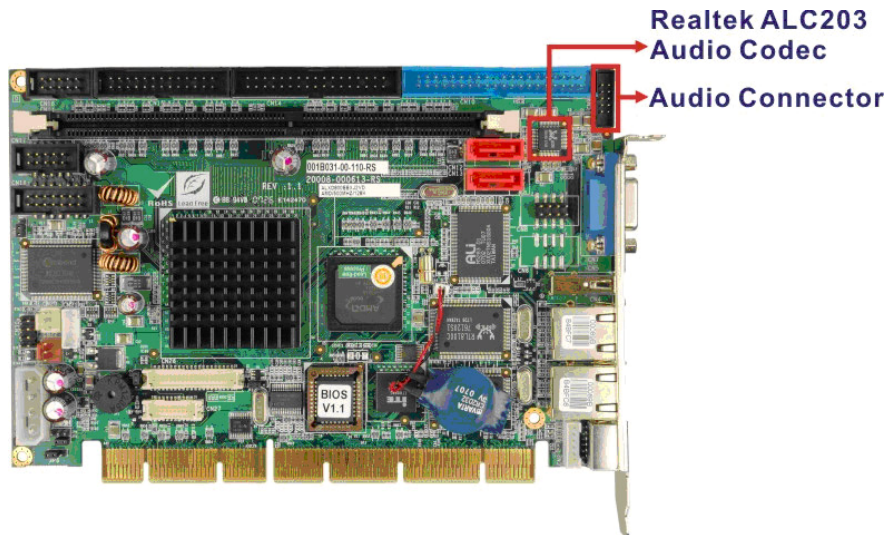
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 20-bit DAC and 18-bit ADC resolution
- 18-bit Stereo full-duplex CODEC with independent and variable sampling rate
- Complies with AC'97 2.3 specifications
  - LINE/HP-OUT, MIC-IN and LINE-IN sensing
  - 14.318MHz -> 24.576MHz PLL saves crystal
  - 12.288MHz BITCLK input can be consumed

- Integrated PCBEEP generator to save buzzer
- Interrupt capability
- Page registers and Analog Plug & Play
- Support of S/PDIF out is fully compliant with AC'97 rev2.3 specifications
- Three analog line-level stereo inputs with 5-bit volume control: LINE\_IN, CD, AUX
- High quality differential CD input
- Two analog line-level mono input: PCBEEP, PHONE-IN
- Supports double sampling rate (96KHz) of DVD audio playback
- Two software selectable MIC inputs
- +6/12/20/30dB boost preamplifier for MIC input
- Stereo output with 6-bit volume control
- Mono output with 5-bit volume control
- Headphone output with 50mW/20Ohm amplifier
- 3D Stereo Enhancement
- Multiple CODEC extension capability
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Stereo MIC record for AEC/BF application
- DC Voltage volume control
- Auxiliary power to support Power Off CD
- Adjustable VREFOUT control
- 2 GPIO pins with smart GPIO volume control
- 2 Universal Audio Jacks (UAJ)® for front panel
- Supports 32K/44.1K/48K/96KHz S/PDIF output
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-Pin LQFP Package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D Positional Audio
- Sensaura™ 3D Enhancement (optional)
- 10 Bands of Software Equalizer



- Voice Cancellation and Key Shifting in Karaoke mode
- AVRack® Media Player

The Realtek ALC203 is connected to one on-board audio connector. The Realtek ALC203 and the audio jack connector are shown in **Figure 2-9** below.



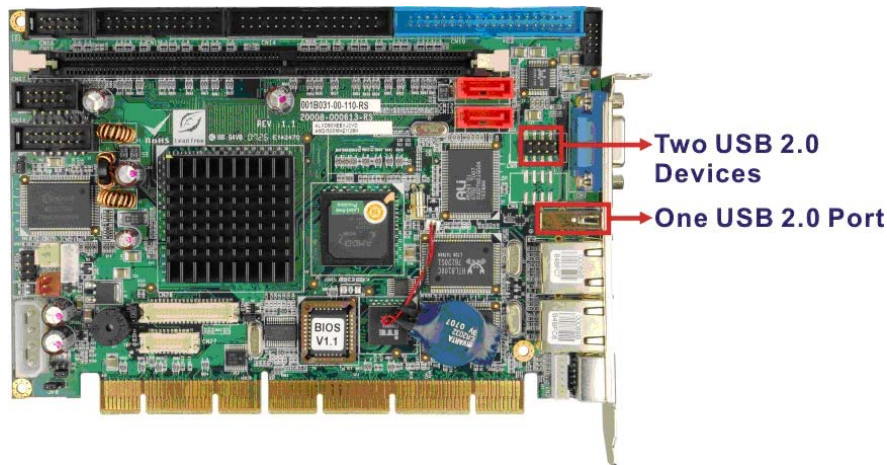
**Figure 2-9: Audio Chipset and Connectors**

#### **2.5.4 AMD Geode™ CS5536 Flash Interface**

The CZGA LX-50 CompactFlash® socket supports standard CF Type I and CF Type II cards. The chipset flash interface is multiplexed with an IDE interface and can be connected to an array of industry standard NAND Flash or NOR Flash devices.

#### **2.5.5 AMD Geode™ CS5536 USB Controller**

The AMD Geode™ CS5536 Southbridge USB 2.0 Controller supports three USB 2.0/1.1 ports. One of these ports is an external connector. The remaining two ports are interfaced to the Southbridge through one 8-pin header connector. The connectors are shown in below.



**Figure 2-10: USB Connectors**

## **2.5.6 AMD Geode™ CS5536 Serial Communications**

Two high-speed UART serial port connectors, one RS-232 and one that can be configured as RS-232, RS-422 or RS-485, are connected to the system chipset low pin count (LPC) port via the LPC bus. The specifications for the serial ports are listed below.

- 16C550 UART with 16-byte FIFO buffer
- 115.2Kbps transmission rate

## **2.5.7 AMD Geode™ CS5536 Low Pin Count (LPC) Interface**

The AMD Geode™ CS5536 LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH6 is connected to the following components:

- BIOS chipset
- Super I/O chipset

## **2.6 LPC Bus Components**

### **2.6.1 LPC Bus Overview**

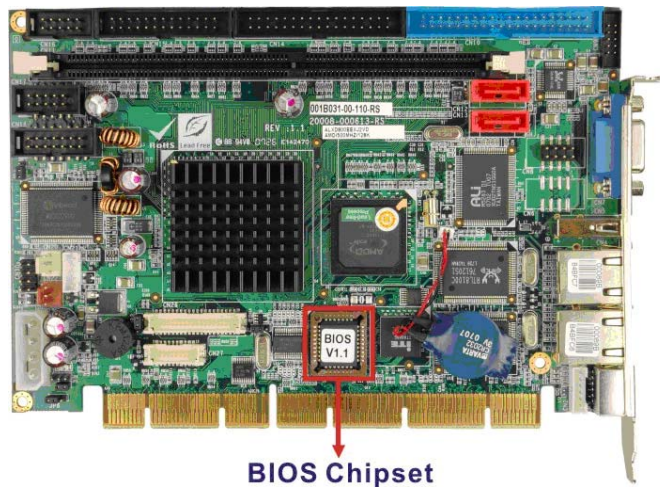
The LPC bus is connected to components listed below:

- BIOS chipset

- Super I/O chipset

## 2.6.2 BIOS Chipset

The BIOS chipset is shown in **Figure 2-11** below.



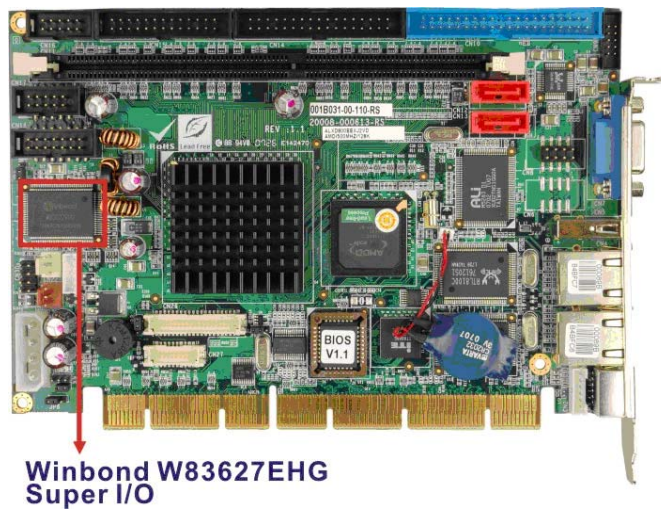
**Figure 2-11: BIOS Chipset**

The BIOS chipset has a licensed copy of Award BIOS installed on the chipset. Some of the BIOS features are listed below:

- Award Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support
- USB booting support

## 2.6.3 Super I/O chipset

The Winbond W83697HG Super I/O chipset is connected to the AMD Geode™ CS5536 southbridge through the LPC bus.



**Figure 2-12: Super IO Chipset**

The Winbond W83697HG is an LPC interface-based Super I/O device that comes with Environment Controller integration, floppy disk controller, UART controller and IR controller. Some of the features of the Winbond W83697HG chipset are listed below:

- LPC Spec. 1.01 compliant
- LDRQ# (LPC DMA) and SERIRQ (serial IRQ) supported
- Hardware monitor functions integrated
- Microsoft PC98/PC99 Hardware Design Guide compliant
- ACPI DPM (Device Power Management) supported

Some of the Super I/O features are described in more detail below:

### **2.6.3.1 Super I/O LPC Interface**

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.01. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

### **2.6.3.2 Super I/O 16C550 UART**

The onboard Super I/O has two integrated 16C550 UARTs that can support the following:

- Two standard serial ports (COM1 and COM2)
- 16-byte send/receive FIFO
- MIDI compatible

One UART is interfaced to a RS-232 serial connector (COM1) and the other is interfaced to a RS-232/422/485 serial connector (COM2).

### 2.6.3.3 Super I/O Hardware Monitor Functions

The Super I/O Hardware Monitor monitors internal voltages, system temperature and the cooling fan speed. All the monitored environmental parameters can be read from the BIOS Hardware Health Configuration menu.

### 2.6.3.4 Super I/O Parallel Port

The Super I/O parallel port (LPT) is compatible with the following LPT specifications.

- IBM parallel port compatible
- PS/2 compatible bi-directional parallel port
- Enhanced Parallel Port (EPP) mode supported. Compatible with IEEE 1284 specifications
- Extended Parallel Port (EPP) mode supported. Compatible with IEEE 1284 specifications
- Enhanced printer port back-drive current protection

The parallel port controller is connected to an external DB-26 LPT connector.

### 2.6.3.5 Super I/O Floppy Disk Drive (FDD) Controller

The Super I/O FDD controller is compatible with the following specifications.

- IBM PC AT disk drive compatible
- Variable write pre-compensation with track selectable capability
- Vertical recording format supported
- DMA logic enabled
- 16-byte data FIFOs
- Overrun and under run conditions detected

- Built-in address mark detection circuitry to simplify the read electronics
- FDD anti-virus functions with software write protect and FDD write enable signal
- Supports 3.5-inch or 5.25-inch FDD
- Compatible with industry standard 82077
- Supported capacities:
  - 360K
  - 720K
  - 1.2M
  - 1.44M
  - 2.88M
- Supported transfer rates
  - 250Kbps
  - 300Kbps
  - 500Kbps
  - 1Mbps
  - 2Mbps
- 3-mode FDD and Win95/98 driver supported

The FDD controller is interfaced to a FDD connected to the backplane through the board-to-board connectors.

#### **2.6.3.6 Super I/O Keyboard and Mouse Controller**

The Super I/O keyboard and mouse controller is compatible with the following specifications.

- 8042 compatible
- Asynchronous access to two data registers and one status register
- Compatible with 8042 software
- PS/2 mouse supported
- Port 92 supported
- Interrupt and polling modes supported
- Fast Gate A20 and Hardware Keyboard Reset
- 8-bit timer/counter

The keyboard and mouse controller controller is interfaced to a keyboard and mouse connected to the backplane through the board-to-board connectors.

### 2.6.3.7 Super I/O GPIO Ports

- The Super I/O has 22 programmable GPIO ports.

## 2.7 PCI Bus Components

### 2.7.1 GeodeLink™ PCI Bridge Overview

The GeodeLink™ PCI Bridge (GLPCI) module provides a PCI interface for GeodeLink Interface Unit-based designs. The GLPCI module is composed of six major blocks:

- GeodeLink Interface
- FIFO/Synchronization
- Transaction Forwarding
- PCI Bus Interface
- PCI Arbiter

The GeodeLink and PCI Bus Interface blocks provide adaptation to the respective buses. The Transaction Forwarding block provides bridging logic. Some of the features of the GeodeLink™ PCI Bridge are listed below:

- PCI Version 2.2 compliance
- 32-bit, 66 MHz PCI bus operation
- Target support for fast back-to-back transactions
- Arbiter support for three external PCI bus masters
- Write gathering and write posting for in-bound write requests
- Virtual PCI header support
- Delayed transactions for in-bound read requests
- Zero wait state operation within a PCI burst
- Dynamic clock stop/start support for GLIU and PCI clock domains (this is not CLKRUN support)
- Capable of handling out of bound transactions immediately after reset

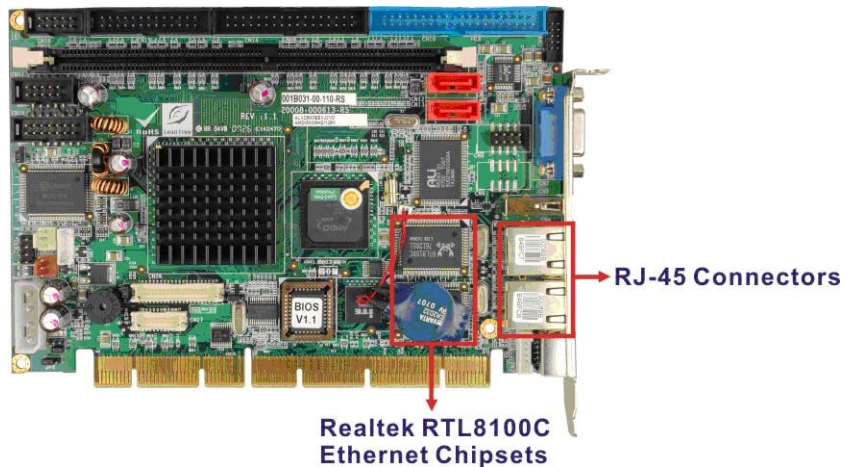
The PCI bus is connected to components listed below:



- Realtek RTL8100C 10/100 Mbps Ethernet controllers
- ALi M5283 SATA drive controllers
- ITE IT8888G PCI-to-ISA bridge

### 2.7.2 Realtek 10/100 Mbps Ethernet Controllers

A highly integrated and cost-effective single-chip, fast Realtek RTL8100C 10/100 Mbps Ethernet controller is interfaced through first the PCI bus and then through the GeodeLink™ PCI Bridge to the CPU and system chipset. The Realtek RTL8100C controller provides 10 Mbps or 100 Mbps Ethernet connectivity to the CZGA LX-50.



**Figure 2-13: RealTek RTL8100C Ethernet Controllers**

Some of the features of the Realtek RTL8100C are listed below.

- 10 Mbps and 100 Mbps operation
- Supports 10 Mbps and 100 Mbps N-way auto-negotiation
- Supports 25 MHz Crystal or 25 MHz OSC as the internal clock source
- Complies with PC99/PC2001 standards
- Supports ACPI power management
- Provides PCI bus master data transfer
- Provides PCI memory space or I/O space mapped data transfer
- Supports PCI clock speed of 16.75 MHz-40 MHz
- Advanced power saving mode
- Supports Wake-on-LAN and remote wake-up (AMD Magic Packet™, Link



Change, and Microsoft® Wake-up frame)

- Half/Full duplex capability
- Supports Full Duplex Flow Control (IEEE 802.3x)
- Provides interface to 93C46 EEPROM to store resource configuration and ID parameters
- Provides PCI clock run pin
- Provides LED pins for network operation status indication
- 2.5/3.3V power supply with 5V tolerant I/Os

### 2.7.3 ALi M5283 SATA Drive Controller

An ALi M5283 SATA drive controller is connected to two SATA drive connectors and interfaced to the system through the PCI bus. The ALi M5283 SATA drive controller has the following features:

- SATA specification revision 1.0 compliant
- PCI specification revision 2.2 compliant
- PCI Bus Power Management Specification revision 1.1 compliant
- Two independent channels to connect up to two SATA hard drive
- Up to 1.5Gb/s SATA data transfer rate
- Built-in 256 byte FIFO for each SATA port ensures fast read/write operations
- 32bit wide, 66MHz PCI bus supported LPC BUS

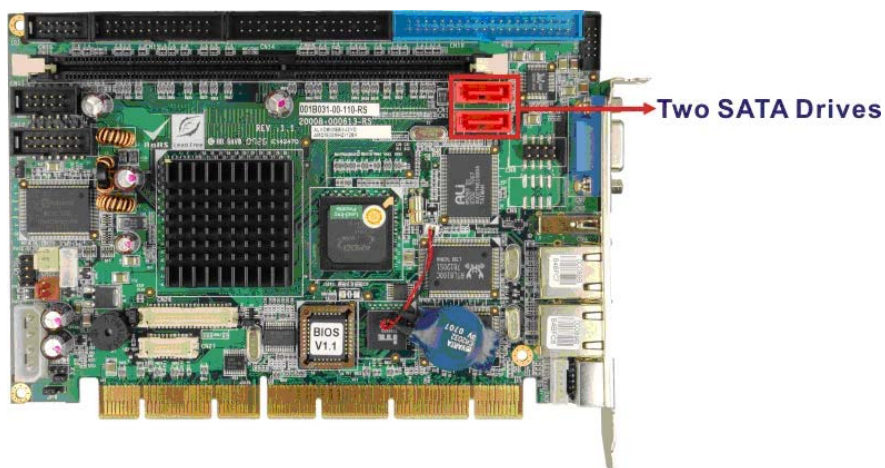
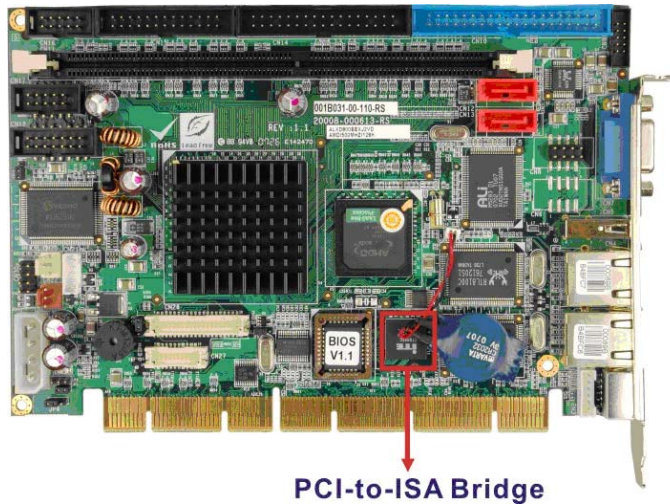


Figure 2-14: SATA Connectors

## 2.7.4 ITE IT8888G PCI-to-ISA Bridge

The AMD CS5536 Southbridge is interfaced to an ITE IT8888G PCI-to-ISA bridge through the PCI bus. The ITE IT8888G PCI-to-ISA bridge is then connected to an ISA edge connector on the bottom of the CZGA LX-50 thereby enabling legacy ISA card expansion on the backplane. The PCI to ISA bridge is shown in **Figure 2-15**.



**Figure 2-15: PCI-to-ISA Bridge**

The ITE IT8888G has a PCI specification v2.1 compliant 32-bit PCI bus interface and supports both PCI Bus master and slave. The PCI interface supports both programmable positive and full subtractive decoding schemes. Some of the features of the IT8888G PCI to ISA bridge are listed below.

- PCI Interface
- Programmable PCI Address Decoders
- PC/PCI DMA Controller
- Distributed DMA Controller
- ISA Interface
- SM Bus
- 1 analog line-level mono output: MONO\_OUT
- Power-on Serial Bus Configuration
- Serial IRQ
- Versatile power-on strapping options

- Supports NOGO function
- Single 33 MHz Clock Input
- +3.3V PCI I/F with +5V tolerant I/O buffers
- +5V ISA I/F and core Power Supply

## 2.8 Environmental and Power Specifications

### 2.8.1 System Monitoring

The thermal inputs on the CZGA LX-50 Super I/O Enhanced Hardware Monitor monitor the following fan speed

- CPU FAN Speed

The voltage inputs on the CZGA LX-50 Super I/O Enhanced Hardware Monitor monitor the following voltages:

- Vcore
- VccMem
- +3.3 V
- +5 V
- +12 V
- VBAT
- 5VSB

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

### 2.8.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the CZGA LX-50 are listed below.

- Minimum Operating Temperature: 0°C (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks

are also mounted on the CPU and southbridge chipset to ensure the operating temperature of these chips remain low.

### 2.8.3 Power Consumption

**Table 2-3** shows the power consumption parameters for the CZGA LX-50 when an AMD Geode LX 800 processor is running with one 256 MB 400 MHz DDR memory module.

| Voltage | Current |
|---------|---------|
| +5V     | 1.094A  |

**Table 2-3: Power Consumption**

Chapter

3

# Unpacking

---

## 3.1 Anti-static Precautions

---



### WARNING:

Failure to take ESD precautions during the installation of the CZGA LX-50 may result in permanent damage to the CZGA LX-50 and severe injury to the user.

---

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the CZGA LX-50. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the CZGA LX-50, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:*** Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the CZGA LX-50, place it on an anti-static pad. This reduces the possibility of ESD damaging the CZGA LX-50.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

## 3.2 Unpacking

### 3.2.1 Unpacking Precautions

When the CZGA LX-50 is unpacked, please do the following:

- Follow the anti-static precautions outlined in Section 3.1.
- Make sure the packing box is facing upwards so the CZGA LX-50 does not fall out of the box.
- Make sure all the components shown in Section 3.3 are present.

### 3.3 Unpacking Checklist













#### NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact CyberResearch, Inc. To contact a CyberResearch sales representative, please call us or send an email to [sales@cyberresearch.com](mailto:sales@cyberresearch.com)

#### 3.3.1 Package Contents



The CZGA LX-50 is shipped with the following components:

| Quantity | Item and Part Number  | Image  |
|----------|-----------------------|--|
| 1        | CZGA LX-50 CPU card   |   |
| 1        | ATA 66/100 flat cable |  |
| 1        | Audio cable           |  |
| 1        | KB/MS PS/2 Y-cable    |  |
| 2        | SATA cables           |  |

|   |                     |  |
|---|---------------------|--|
| 1 | SATA power cable    |  |
| 1 | Single RS-232 cable |  |
| 1 | USB cable           |  |
| 1 | Mini jumper pack    |  |
| 1 | Utility CD          |  |

**Table 3-1: Package List Contents**

### 3.4 Optional Items

|           |  |
|-----------|--|
| FDD cable |  |
| LPT cable |  |

**Table 3-2: Optional Package List Contents**



Chapter

4

# Connector Pinouts

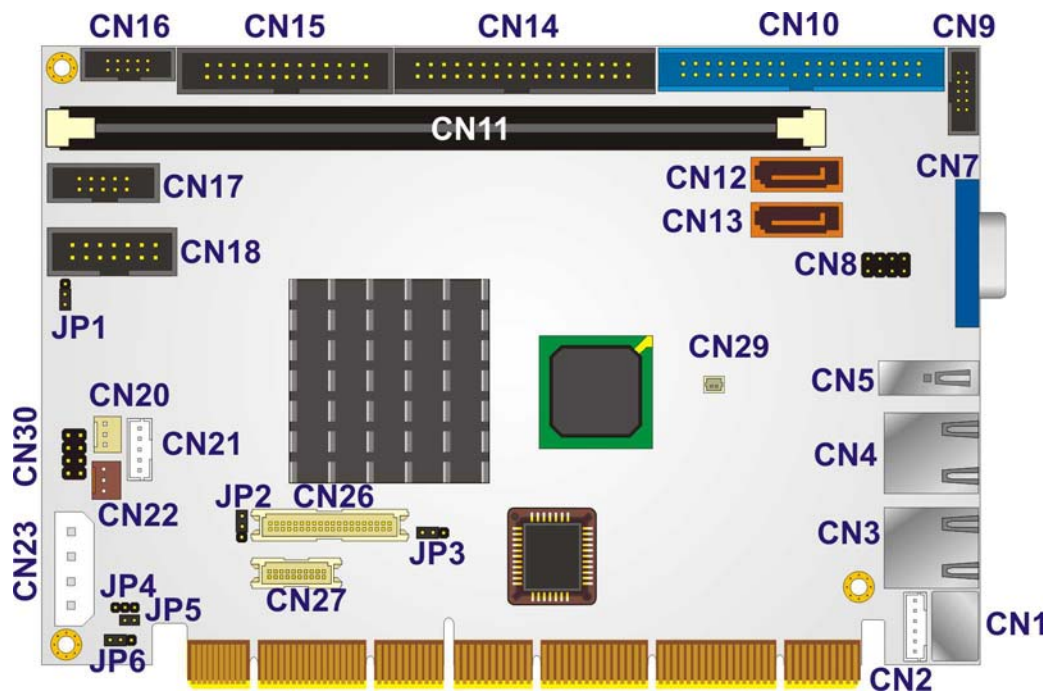
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## 4.1 Peripheral Interface Connectors

**Section 4.1.1** shows peripheral interface connector locations. **Section 4.1.2** lists all the peripheral interface connectors seen in **Section 4.1.1**.

### 4.1.1 CZGA LX-50 Layout

**Figure 4-1** shows the on-board peripheral connectors and on-board jumpers.



**Figure 4-1: Connector and Jumper Locations**

### 4.1.2 Peripheral Interface Connectors

**Table 4-1** shows a list of the peripheral interface connectors on the CZGA LX-50. Detailed descriptions of these connectors can be found in **Section 4.2**.

| Connector                            | Type                   | Label |
|--------------------------------------|------------------------|-------|
| AT power connector                   | 4-pin wafer connector  | CN23  |
| ATX power supply enable connector    | 3-pin wafer connector  | CN22  |
| Audio connector                      | 10-pin box header      | CN9   |
| Battery connector                    | 2-pin wafer connector  | CN29  |
| CompactFlash® card socket            | 50-pin header          | CN28  |
| DIMM socket                          | 184-pin socket         | CN11  |
| FDD connector                        | 34-pin box header      | CN14  |
| Front panel connector                | 8-pin header           | CN30  |
| GPIO connector                       | 10-pin box header      | CN16  |
| IDE Interface connector              | 40-pin box header      | CN10  |
| Keyboard/Mouse connector             | 6-pin wafer connector  | CN2   |
| LCD Inverter connector               | 5-pin wafer connector  | CN21  |
| Parallel port connector              | 26-pin box header      | CN15  |
| RS-232 serial port connector         | 10-pin box header      | CN17  |
| RS-232/422/485 serial port connector | 14-pin box header      | CN18  |
| SATA drive connector (1)             | 7-pin SATA connector   | CN12  |
| SATA drive connector (2)             | 7-pin SATA connector   | CN13  |
| System fan connector                 | 3-pin wafer connector  | CN20  |
| TFT LCD TTL output connector         | 40-pin crimp connector | CN26  |

| Connector                     | Type                   | Label |
|-------------------------------|------------------------|-------|
| TFT LCD LVDS output connector | 20-pin crimp connector | CN27  |
| USB connector                 | 8-pin header           | CN8   |

**Table 4-1: Peripheral Interface Connectors**

#### 4.1.3 External Peripheral Interface Connectors

**Table 4-2** lists the external peripheral interface connectors on the CZGA LX-50. Detailed descriptions of these connectors can be found in **Section 4.3**.

| Connector                | Type                         | Label |
|--------------------------|------------------------------|-------|
| Ethernet connector       | RJ-45 connector              | CN3   |
| Ethernet connector       | RJ-45 connector              | CN4   |
| Keyboard/mouse connector | MINI-DIN connector           | CN1   |
| USB connector            | USB 2.0 connector            | CN5   |
| VGA connector            | HD-D-sub 15 female connector | CN7   |

**Table 4-2: External Peripheral Interface Connectors**

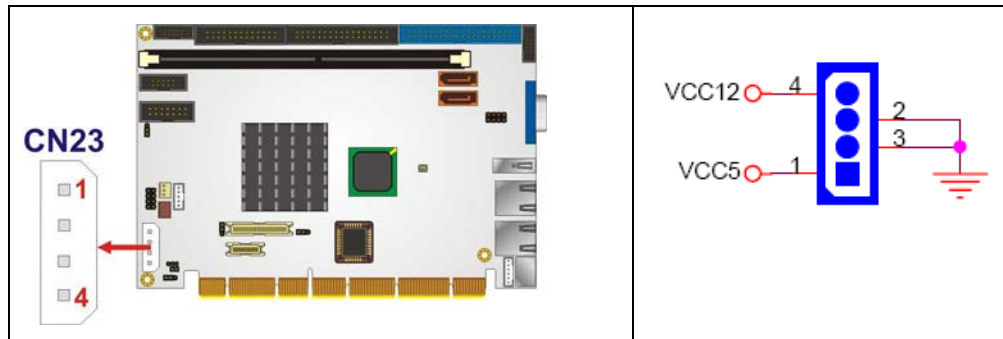
## 4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the CPU card and are only accessible when the CPU card is outside of the chassis. This section has complete descriptions of all the internal peripheral connectors on the CZGA LX-50.

### 4.2.1 AT Power Connector

|                     |                             |
|---------------------|-----------------------------|
| <b>CN Label:</b>    | <b>CN23</b>                 |
| <b>CN Type:</b>     | 4-pin wafer connector (1x4) |
| <b>CN Location:</b> | See <b>Figure 4-2</b>       |
| <b>CN Pinouts:</b>  | See <b>Table 4-3</b>        |

The AT power connector is connected to an AT power source that powers the system.



**Figure 4-2: AT Power Connector Location**

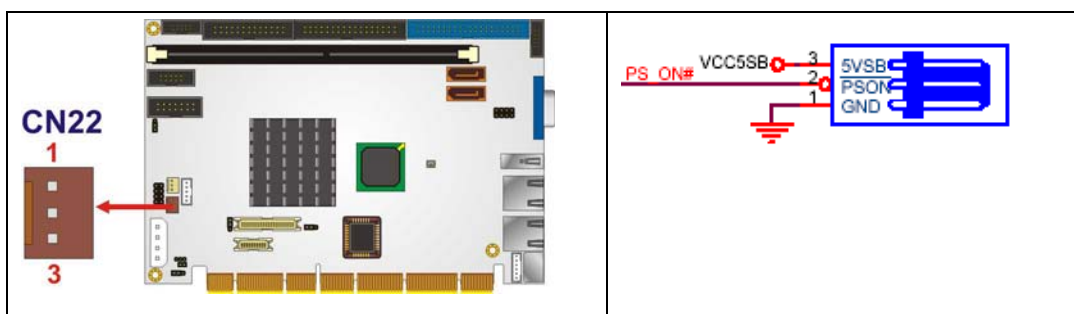
| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | +5V         |
| 2       | GND         |
| 3       | GND         |
| 4       | +12V        |

**Table 4-3: AT Power Connector Pinouts**

### 4.2.2 ATX Power Supply Enable Connector

|                     |                       |
|---------------------|-----------------------|
| <b>CN Label:</b>    | <b>CN22</b>           |
| <b>CN Type:</b>     | 3-pin wafer (1x3)     |
| <b>CN Location:</b> | See <b>Figure 4-3</b> |
| <b>CN Pinouts:</b>  | See <b>Table 4-4</b>  |

The ATX power supply enable connector enables the CZGA LX-50 to be connected to an ATX power supply. In default mode, the CZGA LX-50 can only use an AT power supply. To enable an ATX power supply the AT Power Select jumper must also be configured. Please refer to **Chapter 5** for more details.



**Figure 4-3: ATX Power Supply Enable Connector Location**

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | GND         |
| 2       | PS-ON       |
| 3       | +5V Standby |

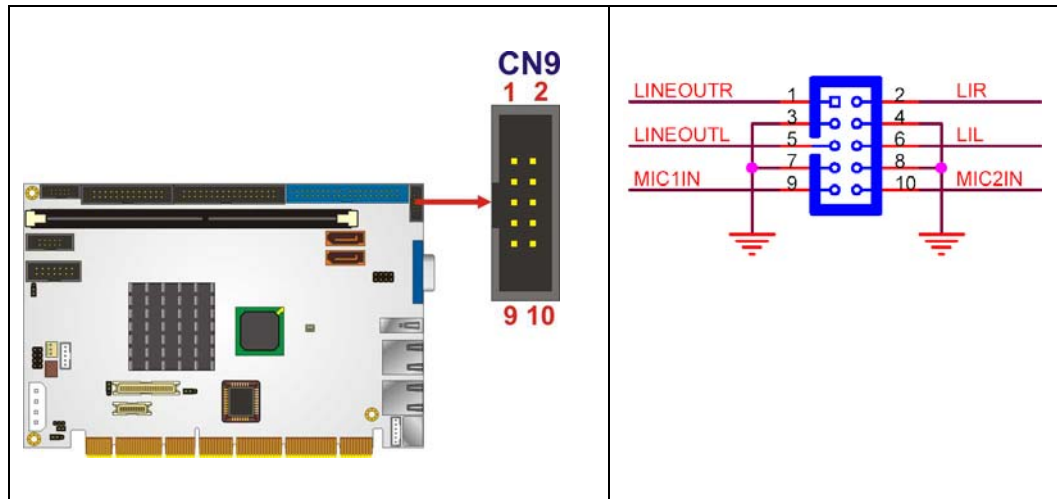
**Table 4-4: ATX Power Supply Enable Connector Pinouts**

### 4.2.3 Audio Connector

|                     |                         |
|---------------------|-------------------------|
| <b>CN Label:</b>    | <b>CN9</b>              |
| <b>CN Type:</b>     | 10-pin box header (2x5) |
| <b>CN Location:</b> | See <b>Figure 4-4</b>   |

**CN Pinouts:** See **Table 4-5**

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.



**Figure 4-4: Audio Connector Location**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | LINE_OUT-R  | 2       | LINE_IN-R   |
| 3       | GND         | 4       | GND         |
| 5       | LINE_OUT-L  | 6       | LINE_IN-L   |
| 7       | GND         | 8       | GND         |
| 9       | MIC1        | 10      | MIC2        |

**Table 4-5: Audio Connector Pinouts**

#### 4.2.4 Battery Connector

**CN Label:** CN29

**CN Type:** 2-pin wafer connector (1x2)

**CN Location:** See **Figure 4-5**

**CN Pinouts:** See **Table 4-6**

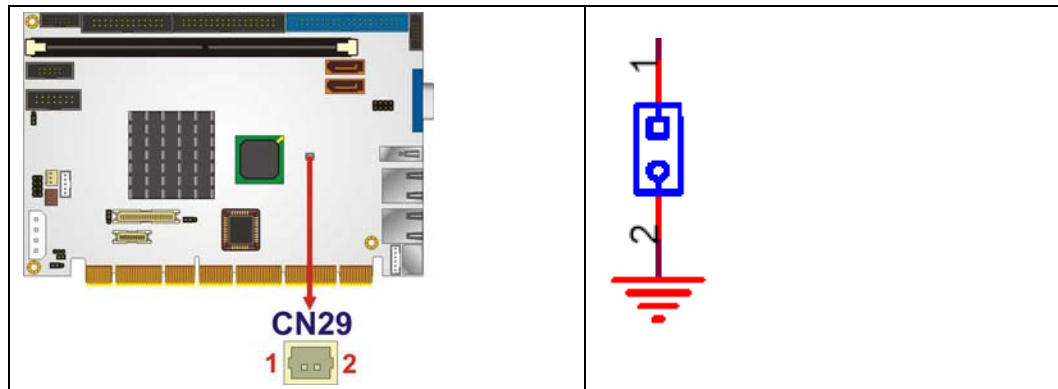


Figure 4-5: Battery Connector Location

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | Battery+    |
| 2       | Battery-    |

Table 4-6: Battery Connector Pinouts

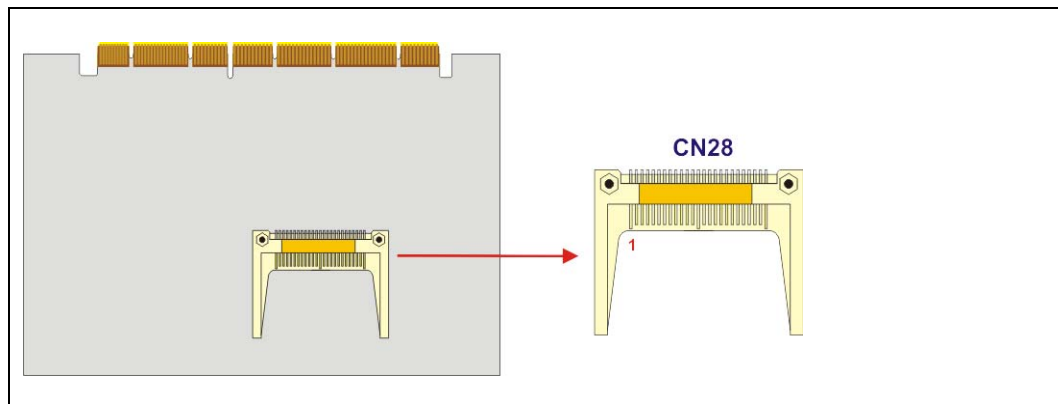
#### 4.2.5 Compact Flash® Connector

**CN Label:** CN28 (solder side)

**CN Type:** 50-pin header (2x25)

**CN Location:** See **Figure 4-6**

**CN Pinouts:** See **Table 4-7**





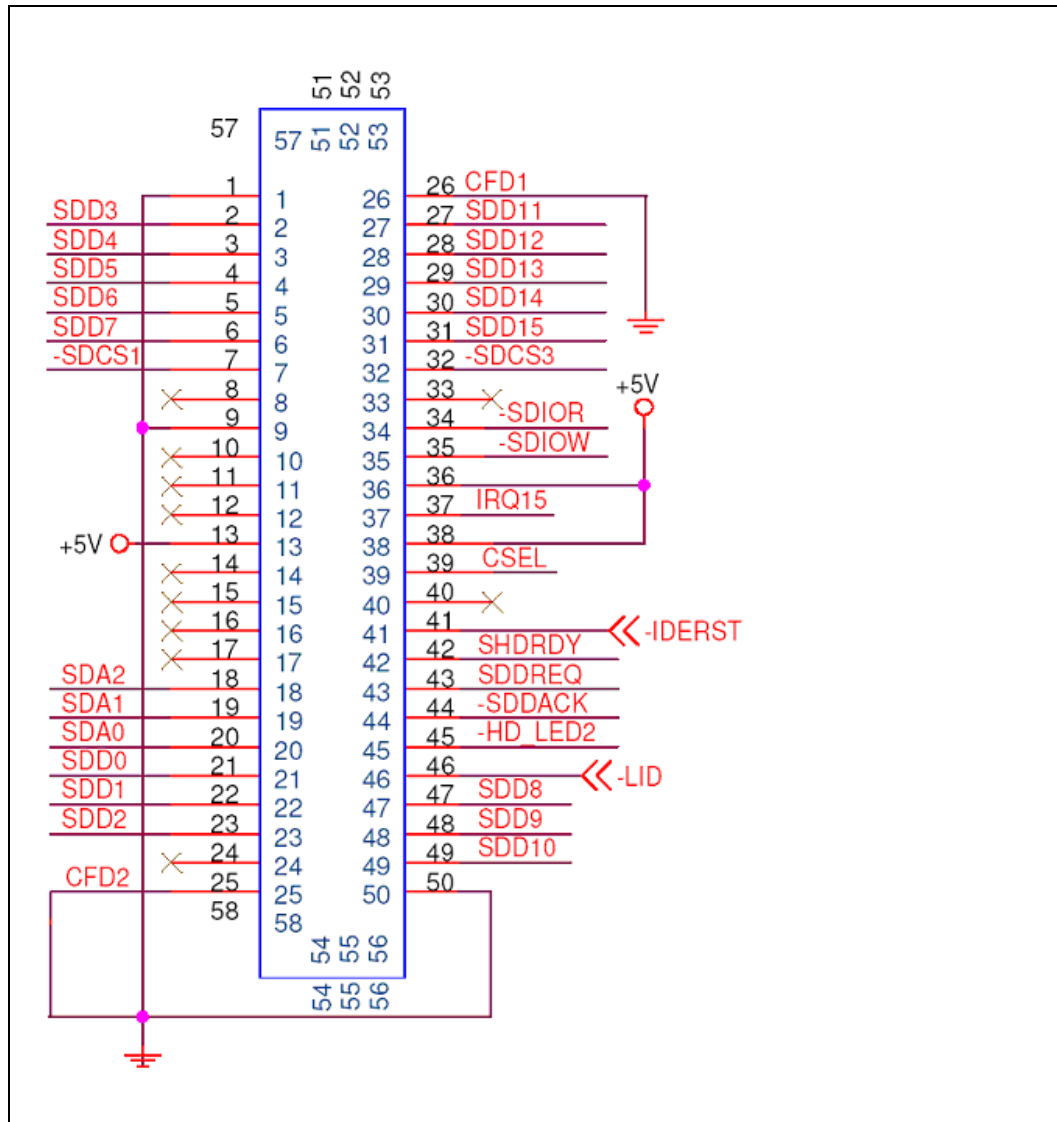


Figure 4-6: Compact Flash® Connector Location

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION   |
|---------|-------------|---------|---------------|
| 1       | GROUND      | 26      | VCC-IN CHECK1 |
| 2       | DATA 3      | 27      | DATA 11       |
| 3       | DATA 4      | 28      | DATA 12       |
| 4       | DATA 5      | 29      | DATA 13       |
| 5       | DATA 6      | 30      | DATA 14       |
| 6       | DATA 7      | 31      | DATA 15       |
| 7       | HDC_CS0#    | 32      | HDC_CS1       |

|    |               |    |             |
|----|---------------|----|-------------|
| 8  | N/C           | 33 | N/C         |
| 9  | GROUND        | 34 | IOR#        |
| 10 | N/C           | 35 | IOW#        |
| 11 | N/C           | 36 | VCC_COM     |
| 12 | N/C           | 37 | IRQ15       |
| 13 | VCC_COM       | 38 | VCC_COM     |
| 14 | N/C           | 39 | CSEL        |
| 15 | N/C           | 40 | N/C         |
| 16 | N/C           | 41 | HDD_RESET   |
| 17 | N/C           | 42 | IORDY       |
| 18 | SA2           | 43 | SDREQ       |
| 19 | SA1           | 44 | SDACK#      |
| 20 | SA0           | 45 | HDD_ACTIVE# |
| 21 | DATA 0        | 46 | 66DET       |
| 22 | DATA 1        | 47 | DATA 8      |
| 23 | DATA 2        | 48 | DATA 9      |
| 24 | N/C           | 49 | DATA 10     |
| 25 | VCC-IN CHECK2 | 50 | GROUND      |

Table 4-7: Compact Flash® Connector Pinouts

#### 4.2.6 Fan Connector

**CN Label:** CN20

**CN Type:** 3-pin wafer (1x3)

**CN Location:** See **Figure 4-7**

**CN Pinouts:** See **Table 4-8**

The cooling fan connector provides a 5V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

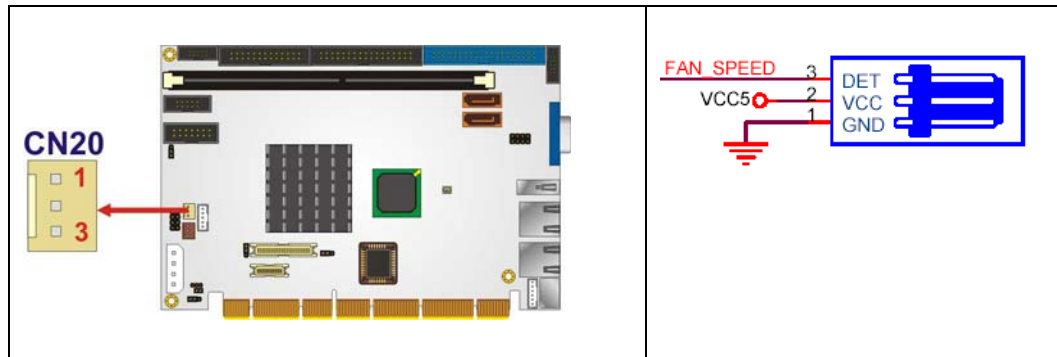


Figure 4-7: Fan Connector Location

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | GND         |
| 2       | +5V         |
| 3       | FAN_SPEED   |

Table 4-8: Fan Connector Pinouts

#### 4.2.7 Floppy Disk Connector

|                     |                          |
|---------------------|--------------------------|
| <b>CN Label:</b>    | <b>CN14</b>              |
| <b>CN Type:</b>     | 34-pin box header (2x17) |
| <b>CN Location:</b> | See <b>Figure 4-8</b>    |
| <b>CN Pinouts:</b>  | See <b>Table 4-9</b>     |

The floppy disk connector connects to a floppy disk drive.

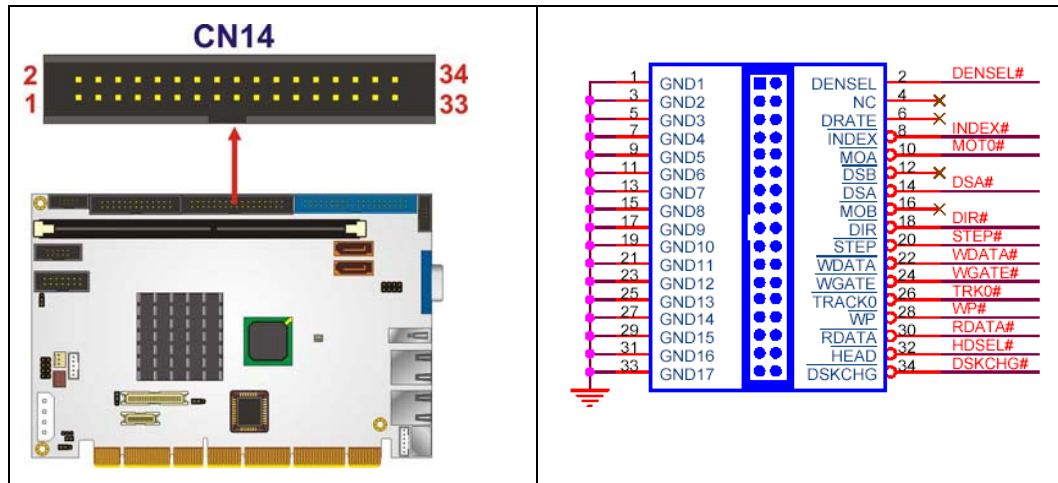


Figure 4-8: 34-pin FDD Connector Location

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | GND         | 2       | DENSEL      |
| 3       | GND         | 4       | NC          |
| 5       | GND         | 6       | NC          |
| 7       | GND         | 8       | INDEX#      |
| 9       | GND         | 10      | MOA#        |
| 11      | GND         | 12      | NC          |
| 13      | GND         | 14      | DSA#        |
| 15      | GND         | 16      | NC          |
| 17      | GND         | 18      | DIR#        |
| 19      | GND         | 20      | STEP#       |
| 21      | GND         | 22      | WDATA#      |
| 23      | GND         | 24      | WGATE#      |
| 25      | GND         | 26      | TRACK0#     |
| 27      | GND         | 28      | WP#         |
| 29      | GND         | 30      | RDATA#      |
| 31      | GND         | 32      | HEAD#       |
| 33      | GND         | 34      | DSKCHG#     |

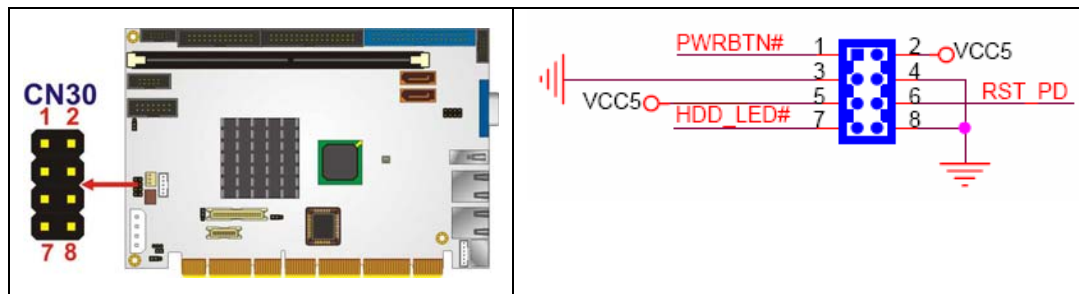
Table 4-9: 34-pin FDD Connector Pinouts

## 4.2.8 Front Panel Connector

|                     |                       |
|---------------------|-----------------------|
| <b>CN Label:</b>    | <b>CN30</b>           |
| <b>CN Type:</b>     | 8-pin header (2x4)    |
| <b>CN Location:</b> | See <b>Figure 4-9</b> |
| <b>CN Pinouts:</b>  | See <b>Table 4-10</b> |

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power button
- Reset button
- Power LED
- HDD LED



**Figure 4-9: Front Panel Connector Pinout Locations**

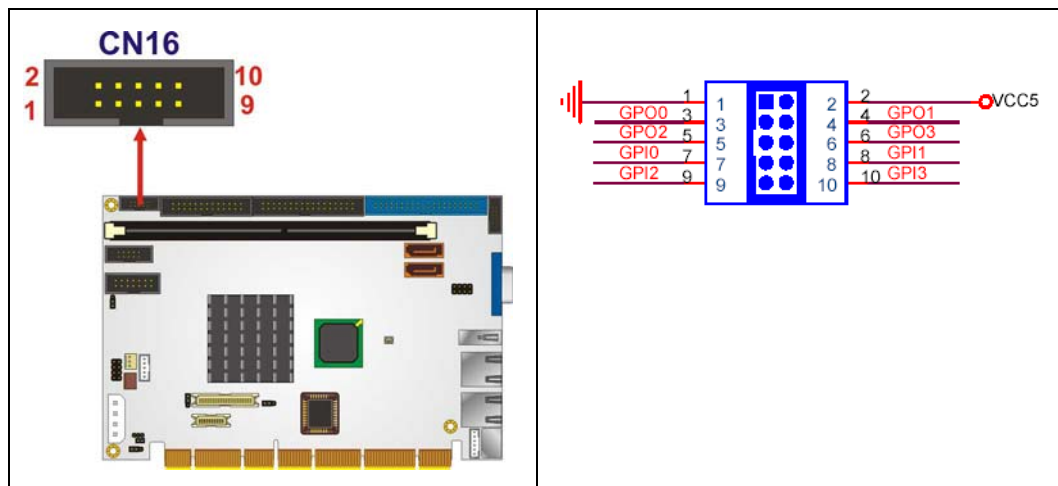
| FUNCTION     | PIN | DESCRIPTION | FUNCTION     | PIN | DESCRIPTION |
|--------------|-----|-------------|--------------|-----|-------------|
| Power Button | 1   | PWRBTN+     | Power LED    | 2   | POWER LED+  |
|              | 3   | PWRBTN-     |              | 4   | POWER LED-  |
| HDD LED      | 5   | HDD LED+    | Reset Button | 6   | RESET+      |
|              | 7   | HDD LED-    |              | 8   | RESET-      |

**Table 4-10: Front Panel Connector Pinouts**

### 4.2.9 GPIO Connector

|                     |                         |
|---------------------|-------------------------|
| <b>CN Label:</b>    | <b>CN16</b>             |
| <b>CN Type:</b>     | 10-pin box header (2x5) |
| <b>CN Location:</b> | See <b>Figure 4-10</b>  |
| <b>CN Pinouts:</b>  | See <b>Table 4-11</b>   |

The General Purpose Input Output (GPIO) connector can be connected to external I/O control devices including sensors, lights, alarms and switches.



**Figure 4-10: GPIO Connector Location**

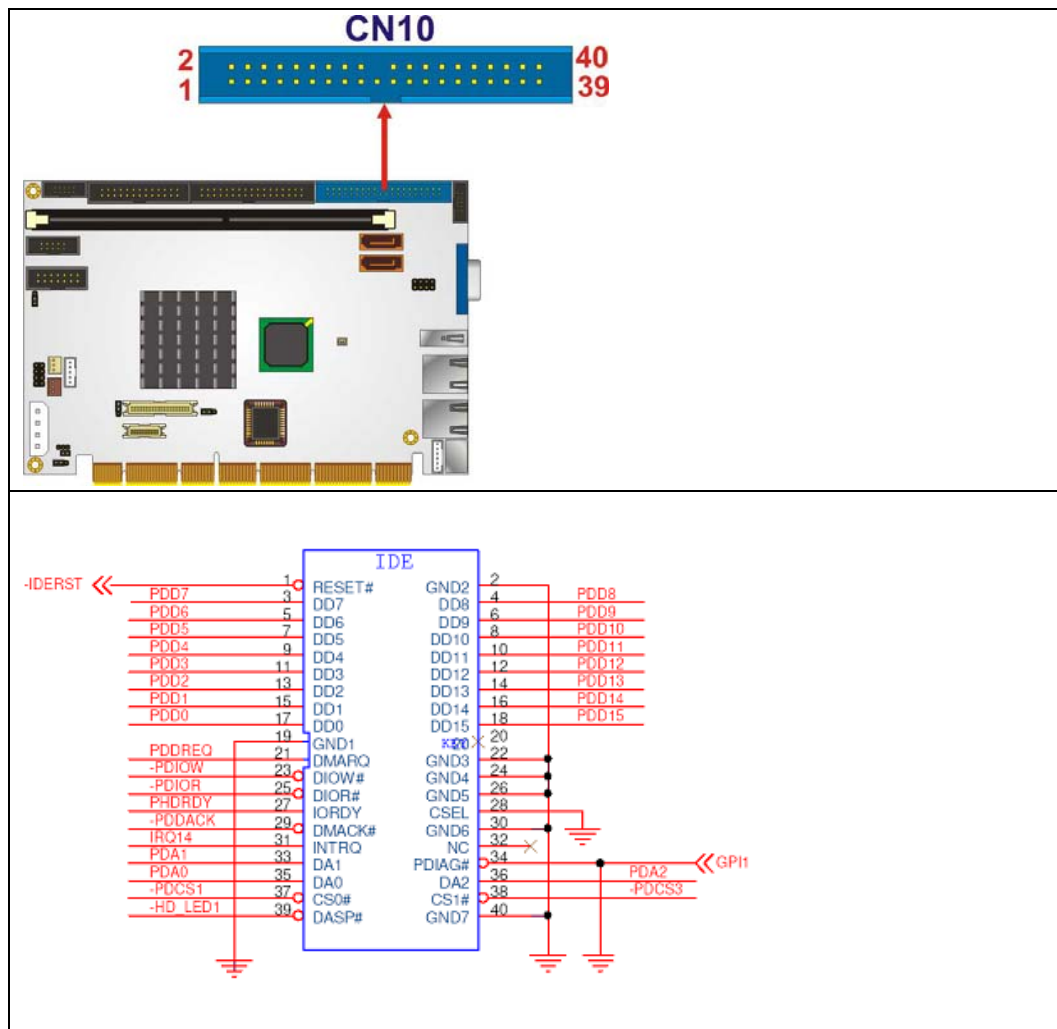
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | GND         | 2       | +5V         |
| 3       | OUT0        | 4       | OUT1        |
| 5       | OUT2        | 6       | OUT3        |
| 7       | IN0         | 8       | IN1         |
| 9       | IN2         | 10      | IN3         |

**Table 4-11: GPIO Connector Pinouts**

#### 4.2.10 IDE Connector

|                     |                          |
|---------------------|--------------------------|
| <b>CN Label:</b>    | <b>CN10</b>              |
| <b>CN Type:</b>     | 40-pin box header (2x20) |
| <b>CN Location:</b> | See <b>Figure 4-11</b>   |
| <b>CN Pinouts:</b>  | See <b>Table 4-12</b>    |

One 40-pin IDE device connector on the CZGA LX-50 CPU card supports connectivity to Ultra ATA/133 IDE devices with data transfer rates up to 133MB/s.



**Figure 4-11: IDE Device Connector Location**

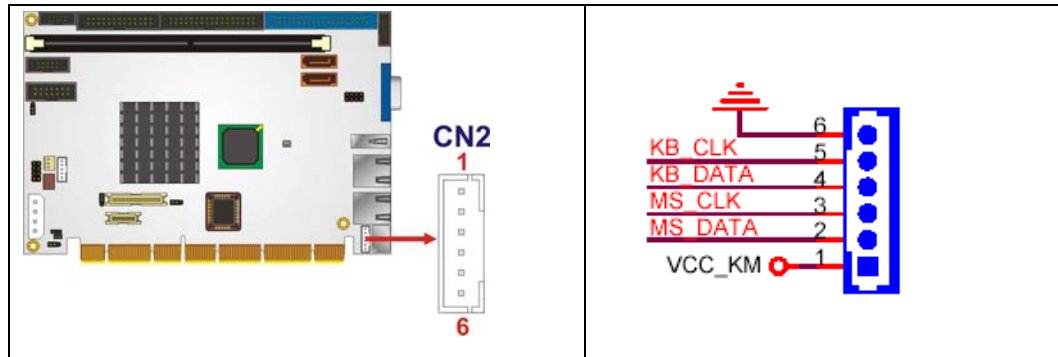
| PIN | DESCRIPTION | PIN | DESCRIPTION |
|-----|-------------|-----|-------------|
| 1   | RESET#      | 2   | GND         |
| 3   | D7          | 4   | D8          |
| 5   | D6          | 6   | D9          |
| 7   | D5          | 8   | D10         |
| 9   | D4          | 10  | D11         |
| 11  | D3          | 12  | D12         |
| 13  | D2          | 14  | D13         |
| 15  | D1          | 16  | D14         |
| 17  | D0          | 18  | D15         |
| 19  | GND         | 20  | NC          |
| 21  | DRQ         | 22  | GND         |
| 23  | IOW#        | 24  | GND         |
| 25  | IOR#        | 26  | GND         |
| 27  | RDY         | 28  | NC          |
| 29  | ACK#        | 30  | GND         |
| 31  | INT         | 32  | NC          |
| 33  | A1          | 34  | CABLEID     |
| 35  | A0          | 36  | A2          |
| 37  | CS0#        | 38  | CS1#        |
| 39  | ASP#        | 40  | GND         |

**Table 4-12: Primary IDE Connector Pinouts****4.2.11 Keyboard/Mouse Connector**

|                     |                             |
|---------------------|-----------------------------|
| <b>CN Label:</b>    | <b>CN2</b>                  |
| <b>CN Type:</b>     | 6-pin wafer connector (1x6) |
| <b>CN Location:</b> | See <b>Figure 4-12</b>      |
| <b>CN Pinouts:</b>  | See <b>Table 4-13</b>       |



The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.



**Figure 4-12: Keyboard/Mouse Connector Location**

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | + 5V        |
| 2       | MSDATA      |
| 3       | MSCLK       |
| 4       | KBDATA      |
| 5       | KBCLK       |
| 6       | GND         |

**Table 4-13: Keyboard/Mouse Connector Pinouts**

#### 4.2.12 LCD Inverter Power Connector

**CN Label:** CN21

**CN Type:** 5-pin wafer (1x5)

**CN Location:** See **Figure 4-13**

**CN Pinouts:** See **Table 4-14**

The inverter connector is connected to the LCD backlight.

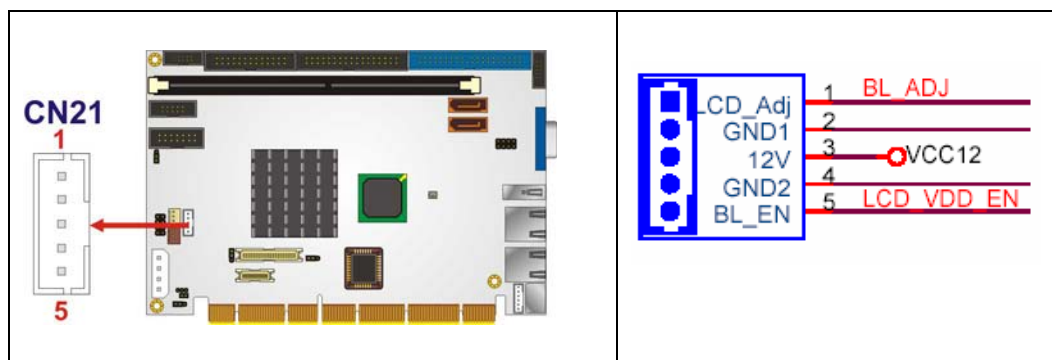


Figure 4-13: LCD Inverter Connector Location

| PIN NO. | DESCRIPTION     |
|---------|-----------------|
| 1       | ADJ (Def : GND) |
| 2       | GND             |
| 3       | +12V            |
| 4       | GND             |
| 5       | BL_EN           |

Table 4-14: Inverter Connector Pinouts

#### 4.2.13 Parallel Port Connector

|                     |                          |
|---------------------|--------------------------|
| <b>CN Label:</b>    | <b>CN15</b>              |
| <b>CN Type:</b>     | 26-pin box header (2x13) |
| <b>CN Location:</b> | See <b>Figure 4-14</b>   |
| <b>CN Pinouts:</b>  | See <b>Table 4-15</b>    |

The 26-pin box header can be connected to a parallel port connector interface or some other parallel port device such as a printer.

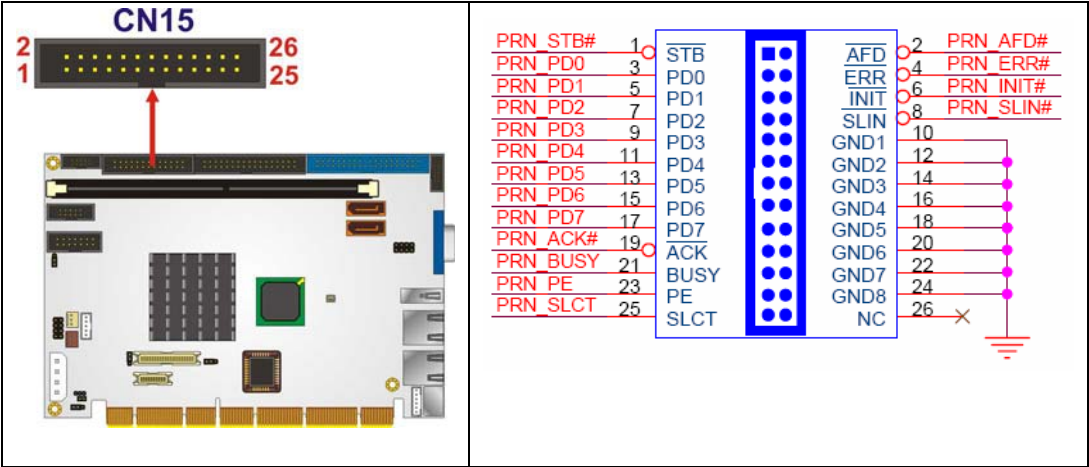


Figure 4-14: Parallel Port Connector Location

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1       | STB#        | 2       | AFD#        |
| 3       | PD0         | 4       | ERR#        |
| 5       | PD1         | 6       | INIT#       |
| 7       | PD2         | 8       | SLIN#       |
| 9       | PD3         | 10      | GND         |
| 11      | PD4         | 12      | GND         |
| 13      | PD5         | 14      | GND         |
| 15      | PD6         | 16      | GND         |
| 17      | PD7         | 18      | GND         |
| 19      | ACK#        | 20      | GND         |
| 21      | BUSY        | 22      | GND         |
| 23      | PE          | 24      | GND         |
| 25      | SLCT        | 26      | NC          |

Table 4-15: Parallel Port Connector Pinouts

4.2.14 RS-232 Serial Port Connector (COM1)

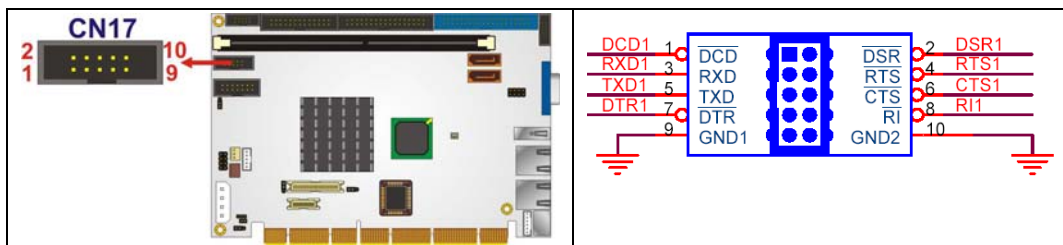
CN Label: CN17

CN Type: 10-pin box header (2x5)

**CN Location:** See **Figure 4-15**

**CN Pinouts:** See **Table 4-16**

The CN17 serial port connector connects to RS-232 serial port devices.



**Figure 4-15: RS-232 Serial Port Connector Location**

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|-----|-------------|-----|-------------|
| 1   | DCD         | 6   | DSR         |
| 2   | RXD         | 7   | RTS         |
| 3   | TXD         | 8   | CTS         |
| 4   | DTR         | 9   | RI          |
| 5   | GND         | 10  | GND         |

**Table 4-16: RS-232 Serial Port Connector Pinouts**

#### 4.2.15 RS-232/422/485 COM Serial Port Connector (COM2)

**CN Label:** CN18

**CN Type:** 14-pin box header (2x7)

**CN Location:** See **Figure 4-16**

**CN Pinouts:** See **Table 4-17**

The 14-pin serial port connector connects to the COM 2 serial communications channels. COM 2 is a multi function channel. In default mode COM 2 is an RS-232 serial communication channel but, with the COM 2 function select jumper, can be configured as either an RS-422 or RS-485 serial communications channel.

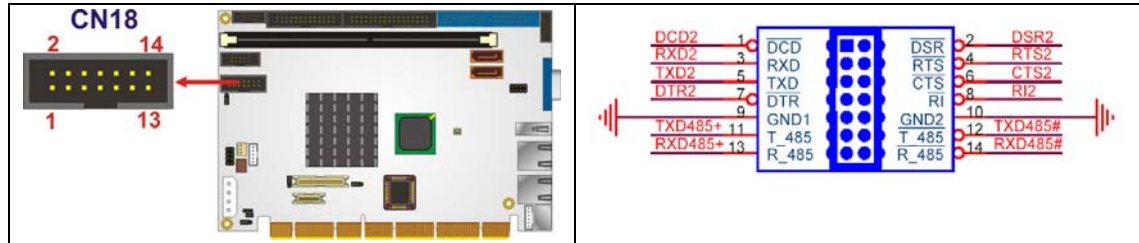


Figure 4-16: RS-232/422/485 Serial Port Connector Location

| PIN | DESCRIPTION | PIN | DESCRIPTION |
|-----|-------------|-----|-------------|
| 1   | DCD#        | 2   | DSR#        |
| 3   | RxD         | 4   | RTS#        |
| 5   | TxD         | 6   | CTS#        |
| 7   | DTR#        | 8   | RI#         |
| 9   | GND         | 10  | GND         |
| 11  | TxD485+     | 12  | TxD485-     |
| 13  | RxD485+     | 14  | RxD485-     |

Table 4-17: RS-232/422/485 Serial Port Connector Pinouts

#### 4.2.16 SATA Drive Connectors

**CN Label:** CN12 and CN13

**CN Type:** 7-pin SATA drive connector (1x7)

**CN Location:** See Figure 4-17

**CN Pinouts:** See Table 4-18

The two SATA drive connectors are connected to two first generation SATA drives. First generation SATA drives transfer data at speeds as high as 1.5 Gbps.

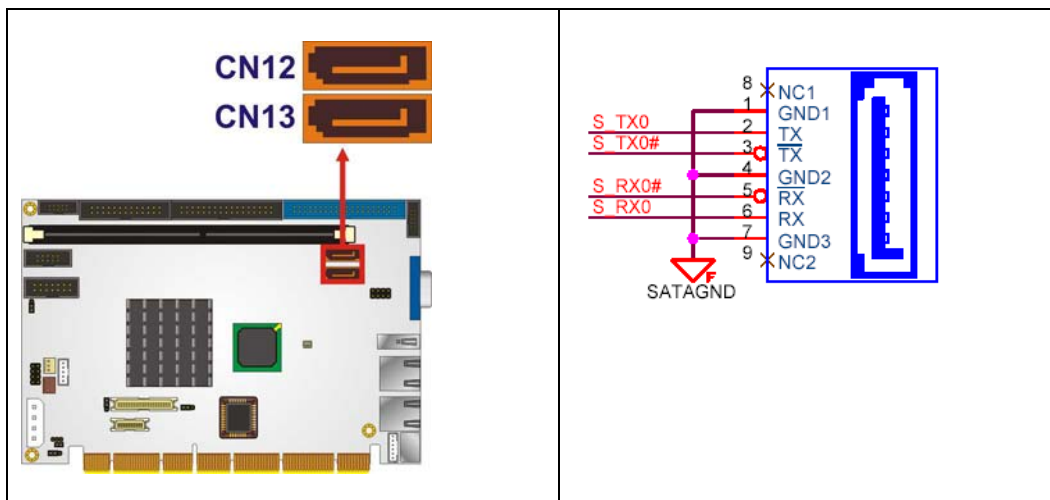


Figure 4-17: SATA Drive Connector Locations

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | GND         |
| 2       | TX0+        |
| 3       | TX0-        |
| 4       | GND         |
| 5       | RX0-        |
| 6       | RX0+        |
| 7       | GND         |

Table 4-18: SATA Drive Connector Pinouts

#### 4.2.17 TFT LCD LVDS Output Connector

|                     |                               |
|---------------------|-------------------------------|
| <b>CN Label:</b>    | <b>CN27</b>                   |
| <b>CN Type:</b>     | 20-pin crimp connector (2x10) |
| <b>CN Location:</b> | See <b>Figure 4-18</b>        |
| <b>CN Pinouts:</b>  | See <b>Table 4-19</b>         |

This connector is connected to a TFT LCD LVDS display device.

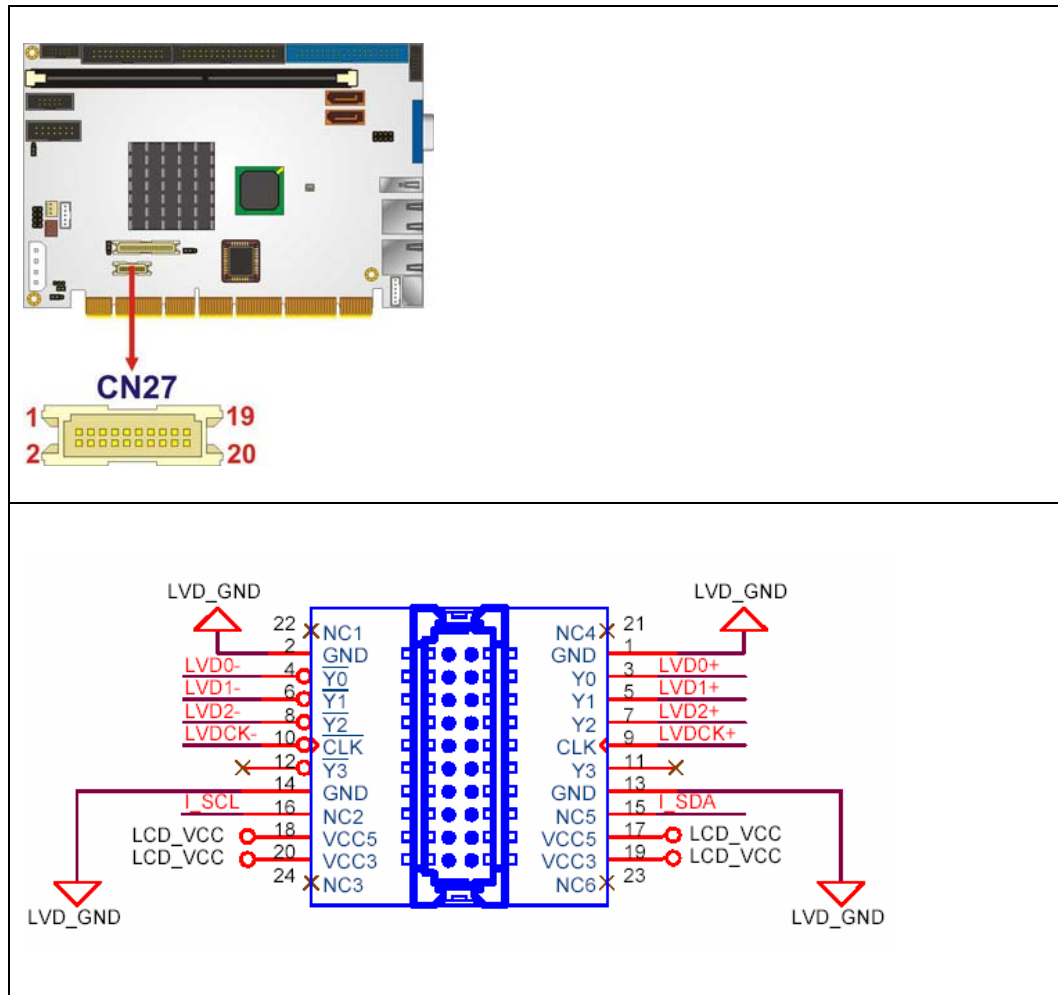


Figure 4-18: TFT LCD LVDS Connector Location

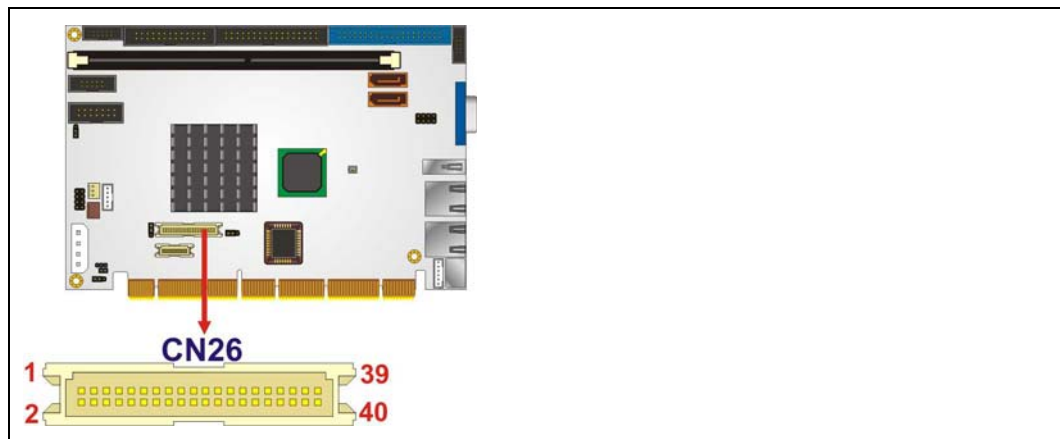
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 2       | GND         | 1       | GND         |
| 4       | D0-         | 3       | D0+         |
| 6       | D1-         | 5       | D1+         |
| 8       | D2-         | 7       | D2+         |
| 10      | CLK-        | 9       | CLK+        |
| 12      | NC          | 11      | NC          |
| 14      | GND         | 13      | GND         |
| 16      | SCL         | 15      | SDA         |
| 18      | LCD_VCC     | 17      | LCD_VCC     |
| 20      | LCD_VCC     | 19      | LCD_VCC     |

Table 4-19: TFT LCD LVDS Connector Pinouts

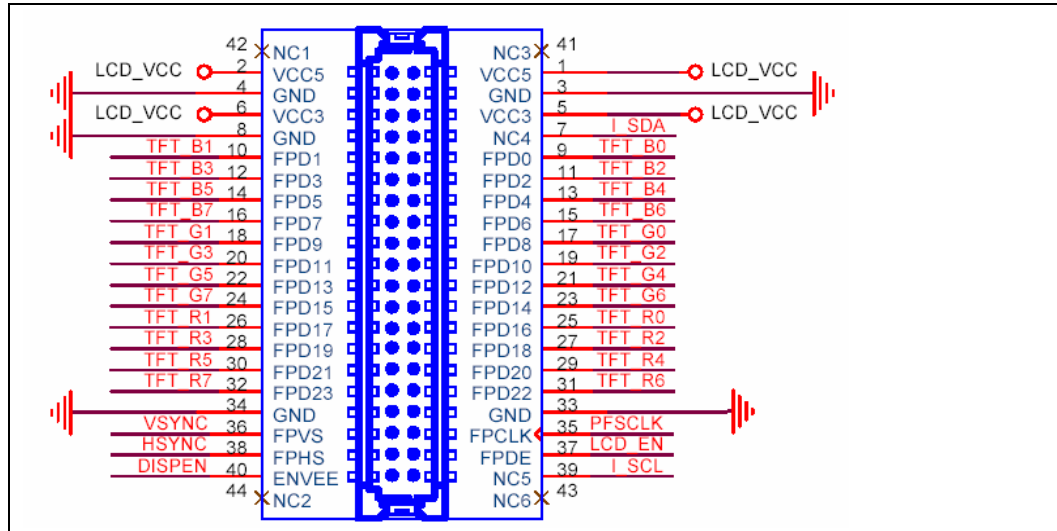
#### 4.2.18 TFT LCD TTL Output Connector

- CN Label:** CN26
- CN Type:** 40-pin crimp connector (2x20)
- CN Location:** See Figure 4-19
- CN Pinouts:** See Table 4-20

This connector is connected to a TFT LCD TTL display device.







|    |         |    |     |
|----|---------|----|-----|
| 40 | DISP_EN | 39 | SCL |
|----|---------|----|-----|

Table 4-20: TFT LCD TTL Connector Pinouts

#### 4.2.19 USB Connector

|                     |                        |
|---------------------|------------------------|
| <b>CN Label:</b>    | <b>CN8</b>             |
| <b>CN Type:</b>     | 8-pin header (2x4)     |
| <b>CN Location:</b> | See <b>Figure 4-20</b> |
| <b>CN Pinouts:</b>  | See <b>Table 4-21</b>  |

The 2x4 USB pin connectors provide connectivity to USB 2.0 ports. Each USB connector can support two USB devices. An additional USB port is found on the rear panel. The USB ports are used for I/O bus expansion.

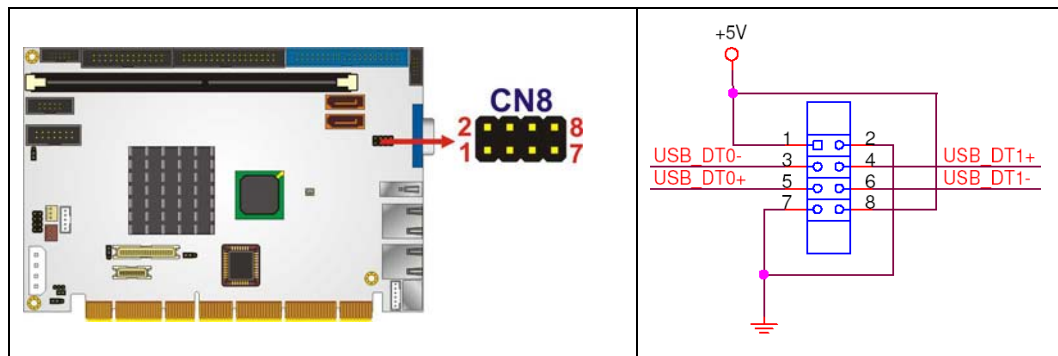


Figure 4-20: USB Connector Location

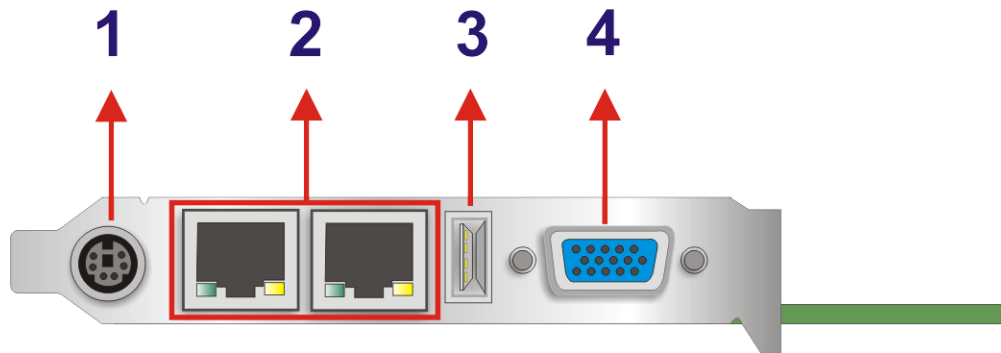
| Port 1  |             | Port 2  |             |
|---------|-------------|---------|-------------|
| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
| 1       | +5V         | 2       | GND         |
| 3       | USB2-       | 4       | USB3+       |
| 5       | USB2+       | 6       | USB3-       |
| 7       | GND         | 8       | +5V         |

Table 4-21: USB Port Connector Pinouts

### 4.3 External Peripheral Interface Connector Panel

**Figure 4-21** shows the CZGA LX-50 external peripheral interface connector panel. The peripheral connectors are connected to external devices when the CZGA LX-50 is installed in a chassis. The peripheral connectors on the panel are:

- 1 x PS/2 keyboard and mouse mini-DIN connector
- 2 x RJ-45 GbE connectors
- 1 x USB connector
- 1 x VGA connector



**Figure 4-21: CZGA LX-50 External Peripheral Interface Connector Panel**

### 4.3.1 LAN Connectors

**CN Label:** CN3 and CN4

**CN Type:** RJ-45

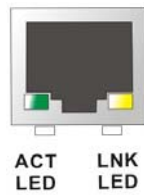
**CN Location:** See **Figure 4-21** (labeled number 2)

**CN Pinouts:** See **Table 4-22**

The CZGA LX-50 is equipped with two built-in GbE Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

| LAN-2 (CN3) |             | LAN-2 (CN4) |             |
|-------------|-------------|-------------|-------------|
| PIN NO.     | DESCRIPTION | PIN NO.     | DESCRIPTION |
| 1           | TX+         | 1           | TX+         |
| 2           | NC          | 2           | NC          |
| 3           | TX-         | 3           | TX-         |
| 4           | RX+         | 4           | RX+         |
| 5           | NC          | 5           | NC          |
| 6           | RX-         | 6           | RX-         |
| 7           | NC          | 7           | NC          |
| 8           | NC          | 8           | NC          |

**Table 4-22: LAN Pinouts**



**Figure 4-22: RJ-45 Ethernet Connector**

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 4-23**.

| STATUS | DESCRIPTION | STATUS | DESCRIPTION |
|--------|-------------|--------|-------------|
| GREEN  | Activity    | YELLOW | Linked      |

**Table 4-23: RJ-45 Ethernet Connector LEDs**

### 4.3.2 Mini-DIN 6 PS/2 Connector

|                     |   |
|---------------------|---|
| <b>CN Label:</b>    | <b>CN1</b>                                |
| <b>CN Type:</b>     | Mini-DIN 6 PS/2                           |
| <b>CN Location:</b> | See <b>Figure 4-21</b> (labeled number 1) |
| <b>CN Pinouts:</b>  | See <b>Table 4-24</b>                     |

The CZGA LX-50 CPU card has a mini-DIN 6 PS/2 connector on the mounting bracket for easy connection to a PS/2 keyboard or PS/2 mouse. The card comes with a cable to convert the mini-DIN 6 PS/2 into two mini-DIN 6 PS/2 connectors for keyboard and mouse connection.

**Figure 4-23: Mini-DIN 6 PS/2 Connector**

| PIN NO. | DESCRIPTION    |
|---------|----------------|
| 1       | KEYBOARD DATA  |
| 2       | MOUSE DATA     |
| 3       | GND            |
| 4       | VCC            |
| 5       | KEYBOARD CLOCK |
| 6       | MOUSE CLOCK    |

**Table 4-24: Mini-DIN 6 PS/2 Connector**

### 4.3.3 USB Connector

|                     |   |
|---------------------|---|
| <b>CN Label:</b>    | <b>CN5</b>                                |
| <b>CN Type:</b>     | USB port                                  |
| <b>CN Location:</b> | See <b>Figure 4-21</b> (labeled number 3) |
| <b>CN Pinouts:</b>  | See <b>Table 4-25</b>                     |

The CZGA LX-50 has a one rear panel USB port. This port connects to both USB 2.0 and USB 1.1 devices.

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | +5V         |
| 2       | USB1-       |
| 3       | USB1+       |
| 4       | GND         |

Table 4-25: USB Port Pinouts

#### 4.3.4 VGA connector

**CN Label:** CN7

**CN Type:** HD-D-sub 15 female connector

**CN Location:** See **Figure 4-21** (labeled number 4)

**CN Pinouts:** See **Table 4-26**

A 15-pin VGA connector connects to standard displays.

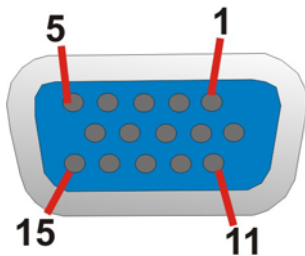


Figure 4-24: VGA Connector

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1       | Red         |
| 2       | Green       |
| 3       | Blue        |
| 4       | NC          |
| 5       | GND         |
| 6       | GND         |

|    |       |
|----|-------|
| 7  | GND   |
| 8  | GND   |
| 9  | NC    |
| 10 | GND   |
| 11 | NC    |
| 12 | SDA   |
| 13 | HSYNC |
| 14 | VSYNC |
| 15 | SCL   |

**Table 4-26: VGA Connector Pinouts**



Chapter

5

# Installation

---

## 5.1 Anti-static Precautions

---



### WARNING:

Failure to take ESD precautions during the installation of the CZGA LX-50 may result in permanent damage to the CZGA LX-50 and severe injury to the user.

---

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the CZGA LX-50. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the CZGA LX-50, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:*** Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the CZGA LX-50, place it on an anti-static pad. This reduces the possibility of ESD damaging the CZGA LX-50.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

## 5.2 Installation Considerations

---



### NOTE:

The following installation notices and installation considerations should be read and understood before the CZGA LX-50 is installed. All installation notices pertaining to the installation of the CZGA LX-50 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the CZGA LX-50 and injury to the person installing the motherboard.

---

### 5.2.1 Installation Notices

---



### WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the CZGA LX-50, CZGA LX-50 components and injury to the user.

---

Before and during the installation please **DO** the following:

- **Read the user manual:**
  - The user manual provides a complete description of the CZGA LX-50 installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD):**
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place the CZGA LX-50 on an antistatic pad:**
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- **Turn all power to the CZGA LX-50 off:**

- When working with the CZGA LX-50, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the CZGA LX-50 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

### 5.2.2 Installation Checklist

The following checklist is provided to ensure the CZGA LX-50 is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The CZGA LX-50 is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - Primary IDE device
  - SATA drives
  - Keyboard and mouse cable
  - Audio cable
  - Power supply
  - USB cable
  - Serial port cable
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen
  - Keyboard

- Mouse
- RS-232 serial communications device
- Parallel port

## 5.3 Unpacking

### 5.3.1 Unpacking Precautions

When the CZGA LX-50 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 5.1**.
- Make sure the packing box is facing upwards so the CZGA LX-50 does not fall out of the box.
- Make sure all the components in the checklist shown in **Section 5.3.2** are present.

### 5.3.2 Unpacking Checklist



#### NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact CyberResearch, Inc. To contact a CyberResearch sales representative, please call us or send an email to [sales@cyberresearch.com](mailto:sales@cyberresearch.com)

---

When the CZGA LX-50 is received, make sure all the components listed below are present.

- 1 x CZGA LX-50 single board computer
- 1 x Mini jumper pack
- 1 x ATA66/100 flat cable
- 2 x SATA cables
- 1 x SATA power cable
- 1 x Single RS-232 cable

- 1 x KB/MS Y cable
- 1 x USB cable
- 1 x Audio cable
- 1 x Utility CD

## 5.4 DIMM Installation

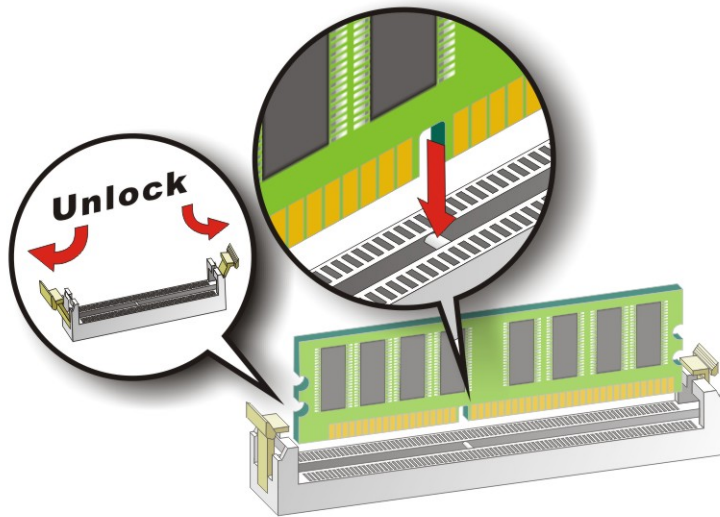


### WARNING:

Using incorrectly specified DIMM may cause permanently damage the CZGA LX-50. Please make sure the purchased DIMM complies with the memory specifications of the CZGA LX-50. DIMM specifications compliant with the CZGA LX-50 are listed in **Chapter 2**.

---

To install a DIMM into a DIMM socket, please follow the steps below and refer to **Figure 5-1**.



**Figure 5-1: Installing a DIMM**

**Step 1:** **Open the DIMM socket handles.** The DIMM socket has two handles that secure the DIMM into the socket. Before the DIMM can be inserted into the

socket, the handles must be opened. See **Figure 5-1**.

**Step 2: Align the DIMM with the socket.** The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See **Figure 5-1**.

**Step 3: Insert the DIMM.** Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 5-1**.

**Step 4: Removing a DIMM.** To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

## 5.5 CF Card Installation



### NOTE:

The CZGA LX-50 can support both CF Type I cards and CF Type II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

---

To install the a CF card (Type I or Type II) onto the CZGA LX-50, please follow the steps below:

**Step 1: Locate the CF card socket.** Place the CZGA LX-50 on an anti-static pad with the solder side facing up. Locate the CF card.

**Step 2: Align the CF card.** Make sure the CF card is properly aligned with the CF socket.

**Step 3: Insert the CF card.** Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 5-2**.

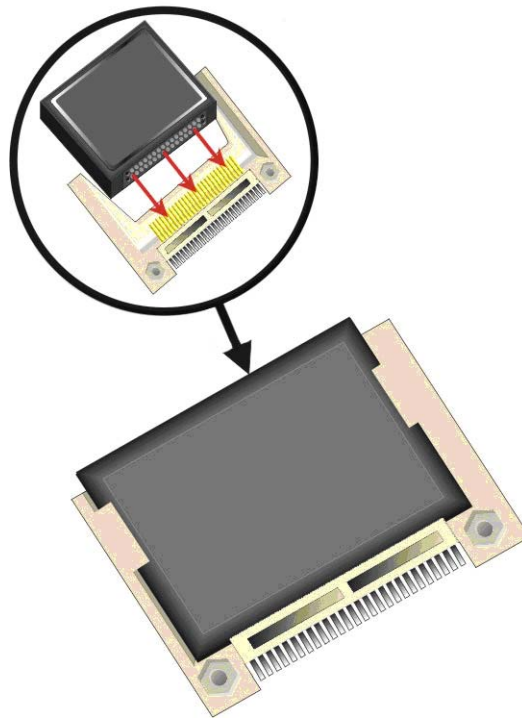


Figure 5-2: CF Card Installation

## 5.6 Jumper Settings



### NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

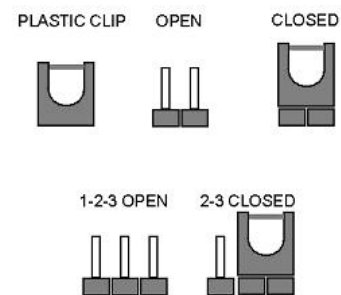


Figure 5-3: Jumper Locations

Before the CZGA LX-50 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the CZGA LX-50 are listed in **Table 5-1**.



| Description            | Label | Type         |
|------------------------|-------|--------------|
| AT power select        | JP5   | 2-pin header |
| CF card setup          | JP6   | 3-pin header |
| COM3 RS-422/485 select | JP1   | 3-pin header |
| LCD clock select       | JP3   | 3-pin header |
| LCD voltage select     | JP2   | 3-pin header |
| PCI VIO voltage select | JP4   | 3-pin header |

**Table 5-1: CZGA LX-50 Jumpers**

### 5.6.1 AT Power Select Jumper

|                         |                       |
|-------------------------|-----------------------|
| <b>Jumper Label:</b>    | <b>JP5</b>            |
| <b>Jumper Type:</b>     | 2-pin header          |
| <b>Jumper Settings:</b> | See <b>Table 5-2</b>  |
| <b>Jumper Location:</b> | See <b>Figure 5-4</b> |

The AT Power Select jumper specifies the systems power mode as AT or ATX. AT Power Select jumper settings are shown in **Table 5-2**.

| AT Power Select | Description   |         |
|-----------------|---------------|---------|
| Short           | Use AT power  | Default |
| Open            | Use ATX power |         |

**Table 5-2: AT Power Select Jumper Settings**

The AT Power Select jumper location is shown in **Figure 5-4**.

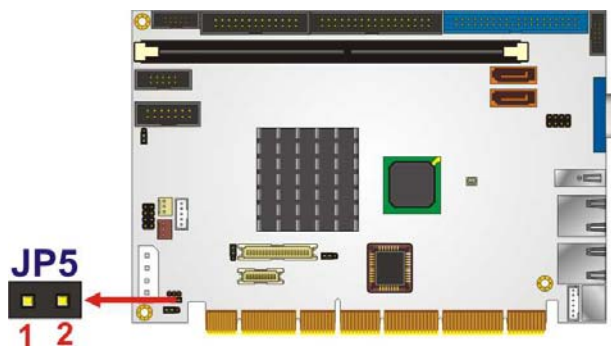


Figure 5-4: AT Power Select Jumper Location

### 5.6.2 CF Card Setup

|                  |                |
|------------------|----------------|
| Jumper Label:    | JP6            |
| Jumper Type:     | 3-pin header   |
| Jumper Settings: | See Table 5-3  |
| Jumper Location: | See Figure 5-5 |

The CF Card Setup jumper sets the CF Type I card or CF Type II cards as either the slave device or the master device. CF Card Setup jumper settings are shown in **Table 5-3**

| CF Card Setup | Description |         |
|---------------|-------------|---------|
| 1-2           | Slave       | Default |
| 2-3           | Master      |         |

Table 5-3: CF Card Setup Jumper Settings

The CF Card Setup jumper location is shown in **Figure 5-5**.

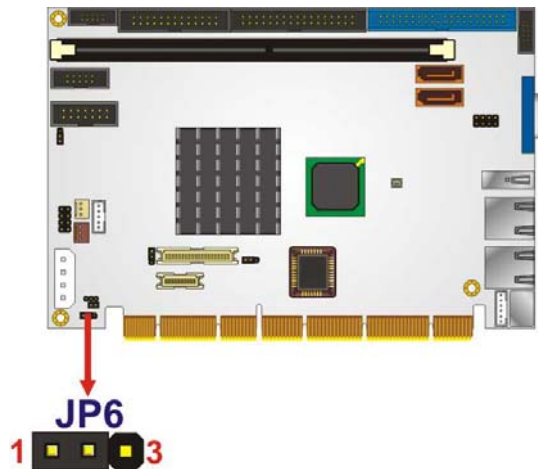


Figure 5-5: CF Card Setup Jumper Location

### 5.6.3 COM2 RS-422/485 Select Jumper

|                         |                |
|-------------------------|----------------|
| <b>Jumper Label:</b>    | <b>JP1</b>     |
| <b>Jumper Type:</b>     | 3-pin header   |
| <b>Jumper Settings:</b> | See Table 5-4  |
| <b>Jumper Location:</b> | See Figure 5-6 |

The RS-422/485 select jumper sets the communication protocol used by the second serial communications port (COM2) as RS-422 or RS-485.

| COM2 Select | Description |         |
|-------------|-------------|---------|
| Short 1-2   | RS-422      |         |
| Short 2-3   | RS-485      | Default |

Table 5-4: COM2 RS-/422/485 Select Settings

The COM2 Function Select jumper location is shown in **Figure 5-6**.

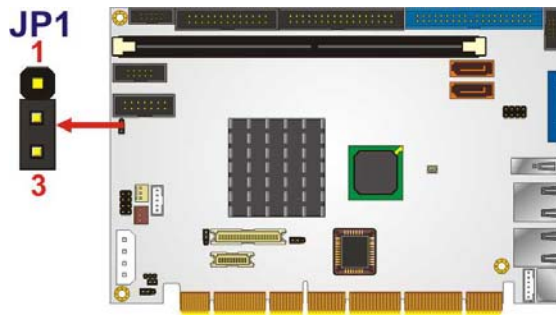


Figure 5-6: COM2 Function Select Jumper Location

#### 5.6.4 LCD Clock Jumper

|                  |                |
|------------------|----------------|
| Jumper Label:    | JP3            |
| Jumper Type:     | 3-pin header   |
| Jumper Settings: | See Table 5-5  |
| Jumper Location: | See Figure 5-7 |

The LCD clock jumper sets the LCD panel shift clock.

| LCD Clock | Description     |         |
|-----------|-----------------|---------|
| Short 1-2 | Normal Output   | Default |
| Short 2-3 | Inverted Output |         |

Table 5-5: LCD Clock Jumper Settings

The LCD Clock jumper location is shown in **Figure 5-7**.

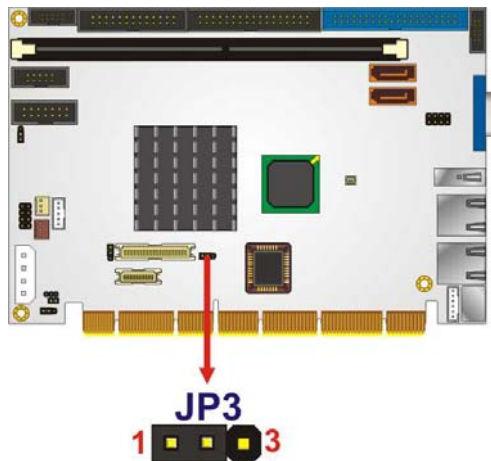


Figure 5-7: LCD Clock Jumper Location

### 5.6.5 LCD Voltage Select Jumper



#### WARNING!

Making the wrong setting on this jumper may cause irreparable damage to both the CPU card and the LCD screen connected to the on-board connector.

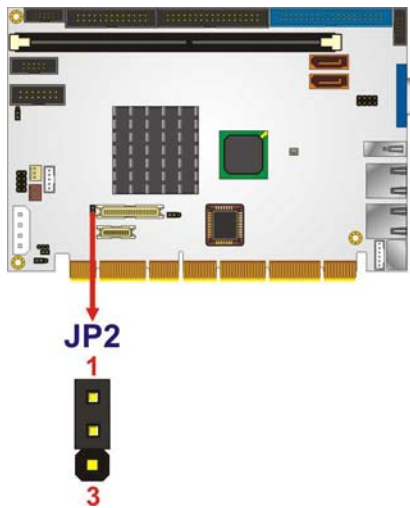
|                         |                       |
|-------------------------|-----------------------|
| <b>Jumper Label:</b>    | <b>JP2</b>            |
| <b>Jumper Type:</b>     | 3-pin header          |
| <b>Jumper Settings:</b> | See <b>Table 5-6</b>  |
| <b>Jumper Location:</b> | See <b>Figure 5-8</b> |

This jumper allows the user to set the voltage for the LCD panel. Before setting this jumper refer to the LCD panel user guide to determine the required voltage. After the required voltage is known, make the necessary jumper setting in accordance with the settings shown in **Table 5-6**.

| LCD Voltage Select | Description |         |
|--------------------|-------------|---------|
| Short 1-2          | + 3.3V      | Default |
| Short 2-3          | + 5V        |         |

**Table 5-6: LCD Voltage Setup Jumper Settings**

The LCD Voltage Select jumper location is shown in **Figure 5-8**.



**Figure 5-8: LCD Voltage Select Jumper Location**

### 5.6.6 PCI VIO Voltage Select Jumper

|                         |                       |
|-------------------------|-----------------------|
| <b>Jumper Label:</b>    | <b>JP4</b>            |
| <b>Jumper Type:</b>     | 3-pin header          |
| <b>Jumper Settings:</b> | See <b>Table 5-7</b>  |
| <b>Jumper Location:</b> | See <b>Figure 5-9</b> |

| LCD Voltage Select | Description |
|--------------------|-------------|
| Short 1-2          | + 3.3V VIO  |
| Short 2-3          | + 5V VIO    |

**Table 5-7: PCI VIO Voltage Jumper Settings**

The PCI VIO Voltage jumper location is shown in **Figure 5-9**.

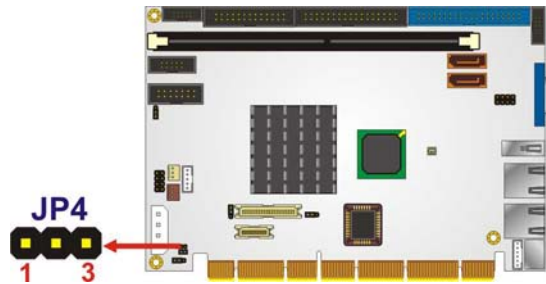


Figure 5-9: PCI VIO Voltage Jumper Location

## 5.7 Chassis Installation

### 5.7.1 Airflow



#### **WARNING:**

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the CZGA LX-50 must have air vents to allow cool air to move into the system and hot air to move out.

The CZGA LX-50 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.



#### **NOTE:**

CyberResearch, Inc. has a wide range of backplanes available. Please call us or visit our website (<http://www.cyberresearch.com>) for additional information.

### 5.7.2 Backplane Installation

Before the CZGA LX-50 can be installed into the chassis, a backplane must first be installed. Please refer to the installation instructions that came with the backplane and the chassis to see how to install the backplane into the chassis.

**NOTE:**

CyberResearch, Inc. has a wide range of backplanes available. Please call us or visit our website (<http://www.cyberresearch.com>) for additional information.

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### 5.7.3 CPU Card Installation

To install the CZGA LX-50 CPU card onto the backplane, carefully align the CPU card interface connectors with the corresponding socket on the backplane. To do this, please refer to the reference material that came with the backplane. Next, secure the CPU card to the chassis. To do this, please refer to the reference material that came with the chassis.

## 5.8 Internal Peripheral Device Connections

### 5.8.1 Peripheral Device Cables

The cables listed in **Table 5-8** are shipped with the CZGA LX-50.

| Quantity | Type                 |
|----------|----------------------|
| 1        | ATA 66/100 HDD cable |
| 1        | Audio cable          |
| 1        | Single RS-232 cable  |
| 1        | KB/MS Y cable        |
| 2        | SATA cables          |



|   |                  |
|---|------------------|
| 1 | SATA power cable |
| 1 | USB cable        |

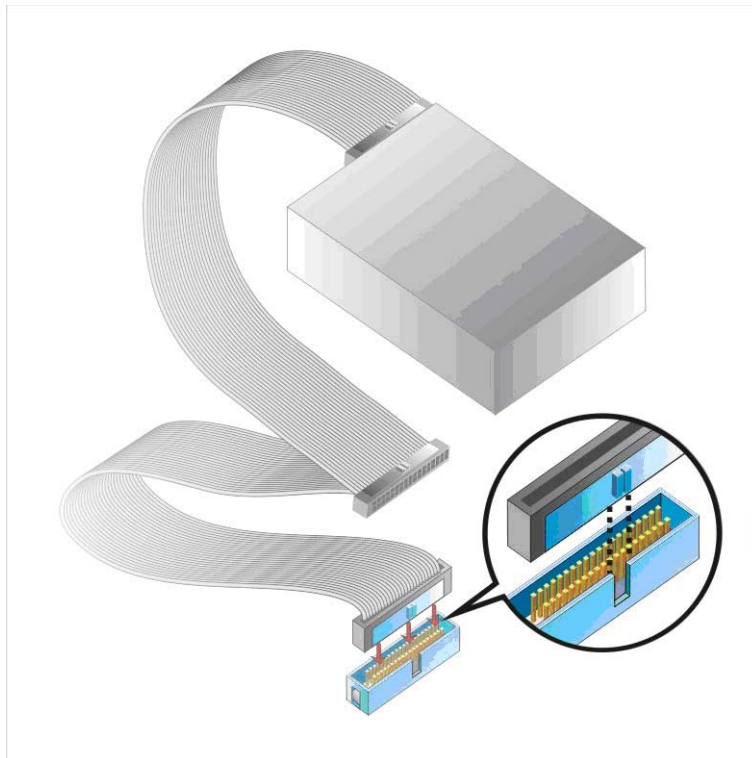
**Table 5-8: Cables Accompanying your Product**

### 5.8.2 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to the CZGA LX-50 to one or two IDE devices. To connect an IDE HDD to the CZGA LX-50 please follow the instructions below.

**Step 1: Locate the IDE connector.** The location/s of the IDE device connector/s is/are shown in **Chapter 3**.

**Step 2: Insert the connector.** Connect the IDE cable connector to the onboard connector. See Figure 5-10. A key on the front of the cable connector ensures it can only be inserted in one direction.



**Figure 5-10: IDE Cable Connection**

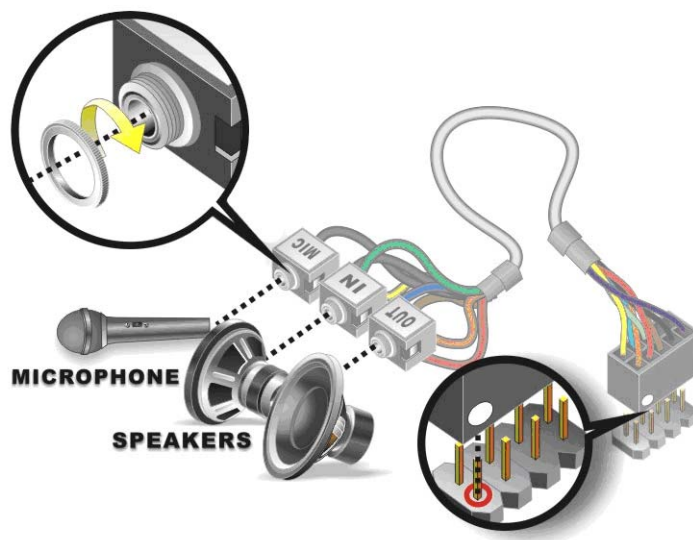
**Step 3:** **Connect the cable to an IDE device.** Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector.

### 5.8.3 Audio Kit Installation

The Audio Kit that came with the CZGA LX-50 connects to the 10-pin audio connector on the CZGA LX-50. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

**Step 1:** **Locate the audio connector.** The location of the 10-pin audio connector is shown in **Chapter 3**.

**Step 2:** **Align pin 1.** Align pin 1 on the onboard connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-11**.



**Figure 5-11: Audio Kit Cable Connection**

**Step 3: Connect the audio devices.** Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

**5.8.4 LVDS LCD Installation**

The CZGA LX-50 can be connected to a TFT LCD screen through the 20-pin LVDS crimp connector on the board. To connect a TFT LCD to the CZGA LX-50, please follow the steps below.

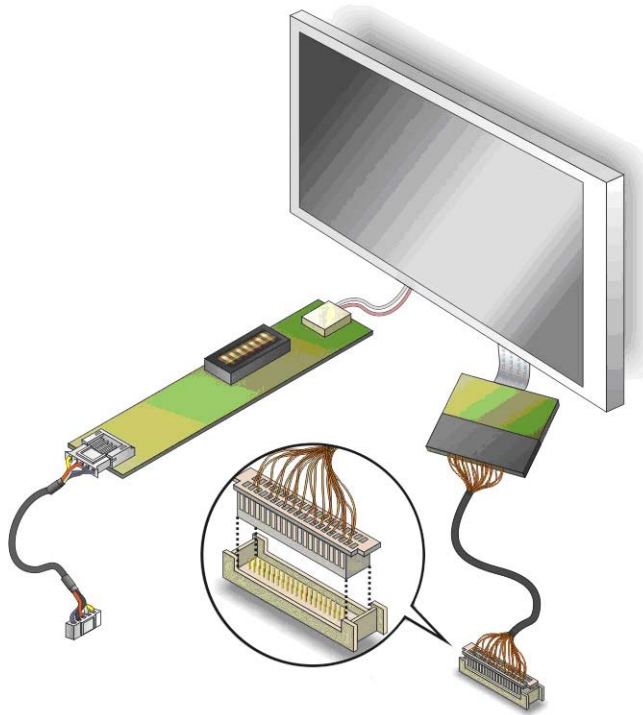
**Step 1: Locate the connector.** The location of the LVDS connector is shown in **Chapter 3**.

**Step 2: Insert the cable connector.** Insert the connector from the LVDS PCB driving board to the LVDS connector as shown in **Figure 5-18**. When connecting the connectors make sure the pins are properly aligned.

**WARNING:**

The diagram below is merely for illustration. The configuration and connection of the cables from the TFT LCD screen being installed may be different. Please refer to the installation manual that came with the TFT LCD screen.

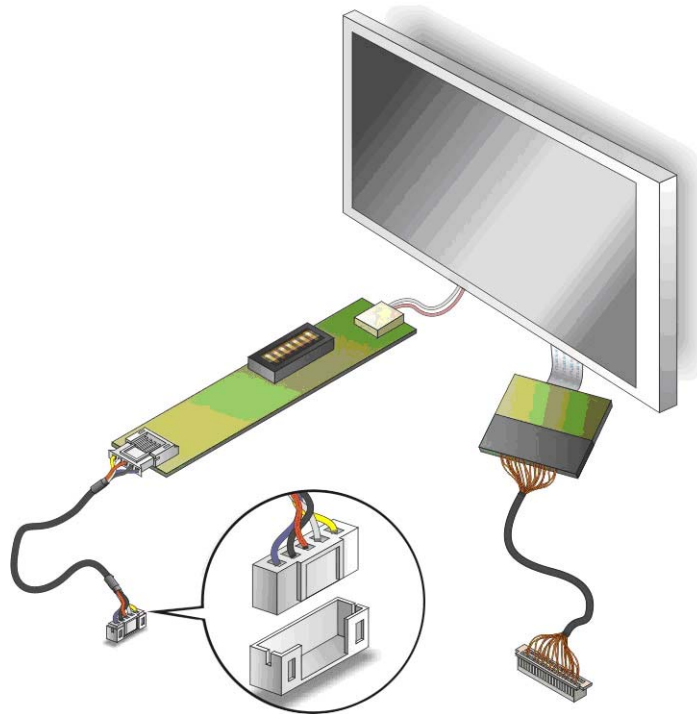
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**Figure 5-12: LVDS Connector**

**Step 3:** **Locate the backlight inverter connector.** The location of the backlight inverter connector is shown in **Chapter 3**.

**Step 4:** **Connect backlight connector.** Connect the backlight connector to the driver TFT LCD PCB as shown in **Figure 5-19**. When inserting the cable connector, make sure the pins are properly aligned.



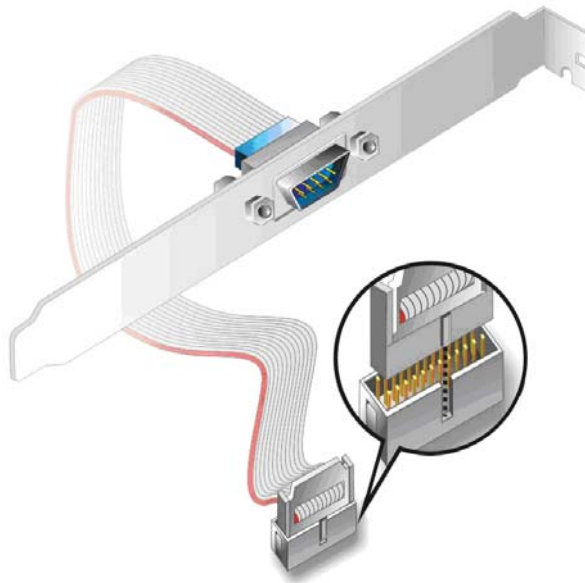
**Figure 5-13: Backlight Inverter Connection**

### 5.8.5 Single RS-232 Cable with Slot Bracket

The single RS-232 cable consists of one serial port connectors attached to a serial communications cable that is then attached to a D-sub 9 male connector that is mounted onto a bracket. To install the single RS-232 cable, please follow the steps below.

**Step 1: Locate the connector.** The location of the RS-232 connector is shown in **Chapter 3**.

**Step 2: Insert the cable connector.** Insert the connector into the serial port box header. See **Figure 5-14**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.



**Figure 5-14: Single RS-232 Cable Installation**

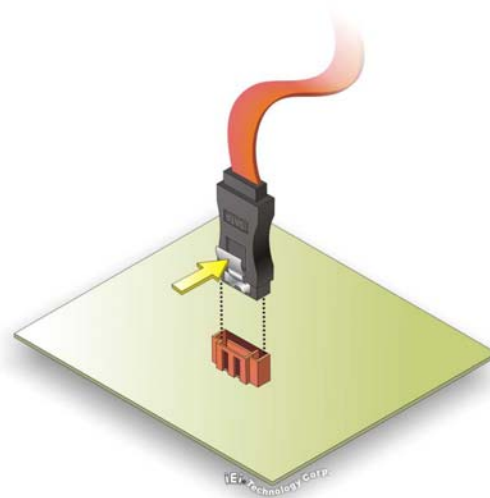
**Step 3: Secure the bracket.** The single RS-232 connector has one D-sub 9 male connector secured to a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis

### 5.8.6 SATA Drive Connection

The CZGA LX-50 is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

**Step 1: Locate the connectors.** The locations of the SATA drive connectors are shown in **Chapter 3**.

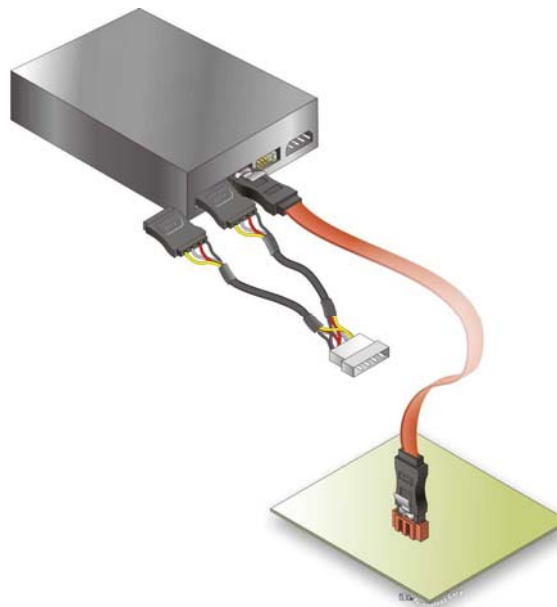
**Step 2: Insert the cable connector.** Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector. See **Figure 5-15**.



**Figure 5-15: SATA Drive Cable Connection**

**Step 3:** Connect the cable to the SATA disk. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-16**.

**Step 4:** Connect the SATA power cable. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-16**.



**Figure 5-16: SATA Power Drive Connection**

### 5.8.7 USB Cable (Dual Port) with Slot Bracket

The CZGA LX-50 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

**Step 1: Locate the connectors.** The locations of the USB connectors are shown in Chapter 3.



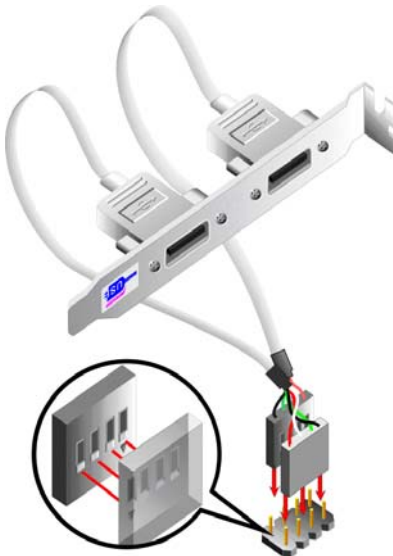
#### **WARNING:**

If the USB pins are not properly aligned, the USB device can burn out.

---

**Step 2: Align the connectors.** The cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the CZGA LX-50 USB connector.

**Step 3: Insert the cable connectors** Once the cable connectors are properly aligned with the USB connectors on the CZGA LX-50, connect the cable connectors to the onboard connectors. See **Figure 5-17**.



**Figure 5-17: Dual USB Cable Connection**



**Step 4: Attach the bracket to the chassis.** The USB 2.0 connectors are attached to a bracket. To secure the bracket to the chassis please refer to the installation instructions that came with the chassis.

### 5.8.8 TTL LCD Installation

The CZGA LX-50 can be connected to a TFT LCD screen through the 40-pin TTL screen on the board. To connect a TFT LCD to the CZGA LX-50, please follow the steps below.

**Step 1: Locate the connector.** The location of the TTL connector is shown in **Chapter 3**.

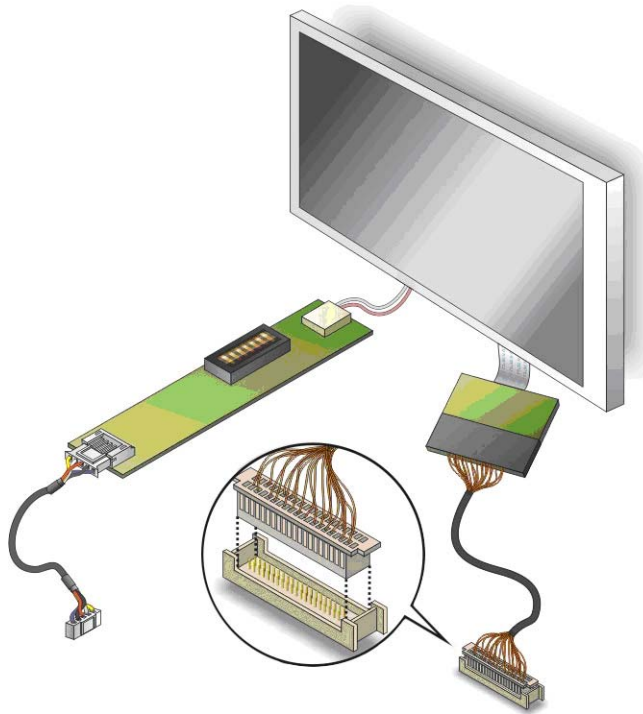
**Step 2: Insert the cable connector.** Insert the connector from the TTL PCB driving board to the TTL connector as shown in **Figure 5-18**. When connecting the connectors make sure the pins are properly aligned.



#### **WARNING:**

The diagram below is merely for illustration. The configuration and connection of the cables from the TFT LCD screen being installed may be different. Please refer to the installation manual that came with the TFT LCD screen.

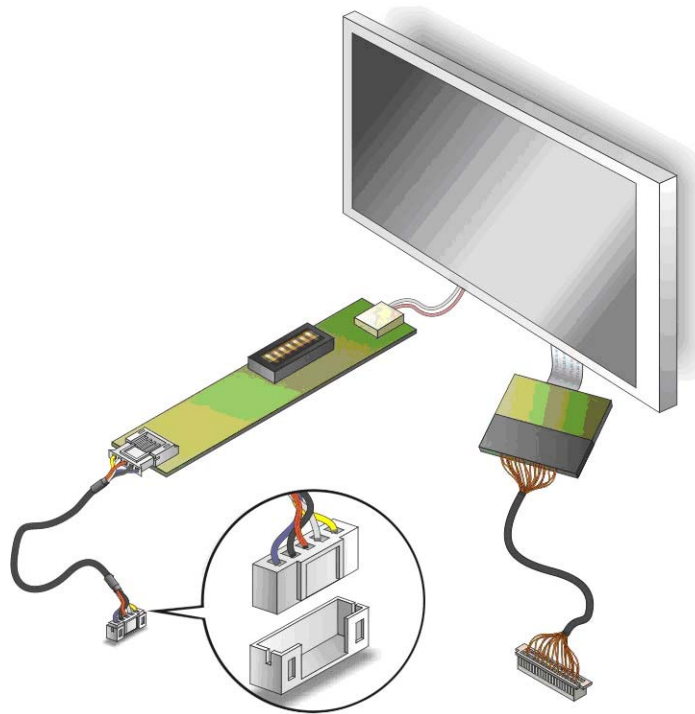
---



**Figure 5-18: TTL Connector**

**Step 3:** **Locate the backlight inverter connector.** The location of the backlight inverter connector is shown in **Chapter 3**.

**Step 4:** **Connect backlight connector.** Connect the backlight connector to the driver TFT LCD PCB as shown in **Figure 5-19**. When inserting the cable connector, make sure the pins are properly aligned.



**Figure 5-19: Backlight Inverter Connection**

## 5.9 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- RJ-45 Ethernet cable connectors
- PS/2 devices
- USB device
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding CZGA LX-50 external peripheral interface connector making sure the pins are properly aligned.

### 5.9.1 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

**Step 1:** **Locate the RJ-45 connectors.** The locations of the USB connectors are shown in **Chapter 4**.

**Step 2:** **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the CZGA LX-50. See **Figure 5-20**.

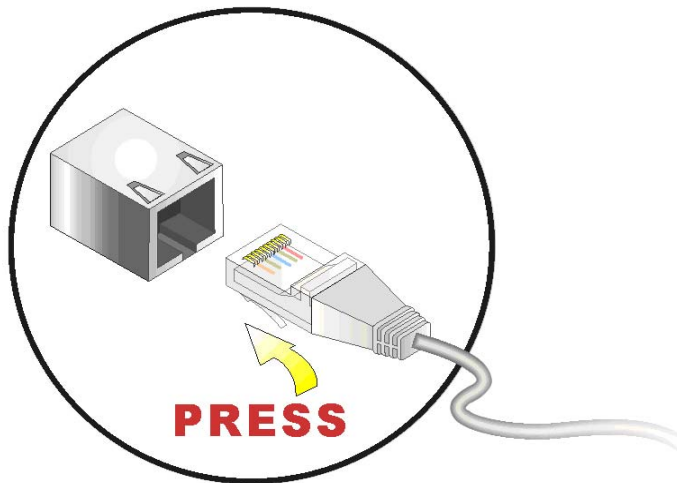


Figure 5-20: LAN Connection

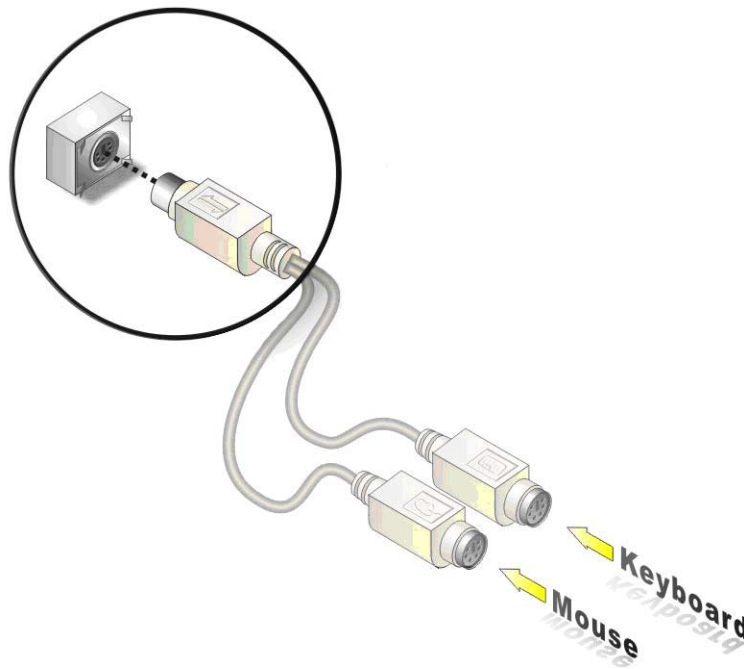
**Step 3:** **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

### 5.9.2 PS/2 Y-Cable Connection

The CZGA LX-50 has a PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is connected to the PS/2 Y-cable that came with the CZGA LX-50. One of the PS/2 cables is connected to a keyboard and the other to a mouse to the system. Follow the steps below to connect a keyboard and mouse to the CZGA LX-50.

**Step 1:** **Locate the dual PS/2 connector.** The location of the PS/2 connector is shown in **Chapter 3**.

**Step 2:** **Insert the keyboard/mouse connector.** Insert the PS/2 connector on the end of the PS/2 y-cable into the external PS/2 connector. See **Figure 5-21**.



**Figure 5-21: PS/2 Keyboard/Mouse Connector**

**Step 3:** **Connect the keyboard and mouse.** Connect the keyboard and mouse to the appropriate connector. The keyboard and mouse connectors can be distinguished from each other by looking at the small graphic at the top of the connector.

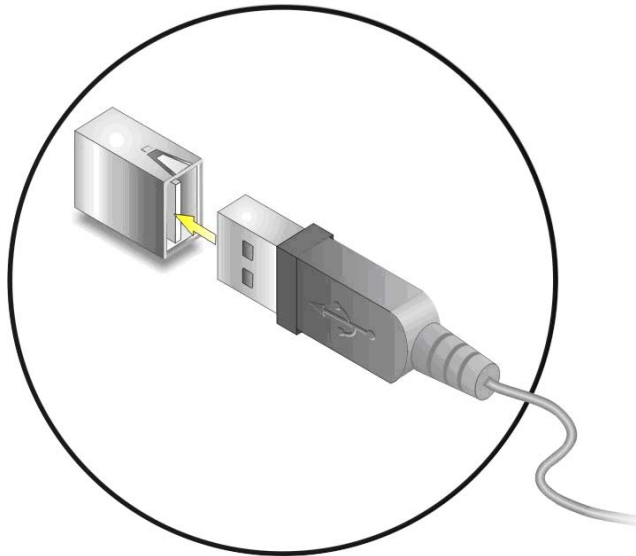
### 5.9.3 USB Device Connection

There are two external USB 2.0 connectors. Both connectors are perpendicular to the CZGA LX-50. To connect a USB 2.0 or USB 1.1 device, please follow the instructions below.

**Step 1:** **Located the USB connectors.** The locations of the USB connectors are shown

in **Chapter 4**.

**Step 2: Align the connectors.** Align the USB device connector with one of the connectors on the CZGA LX-50. See Figure 5-22.



**Figure 5-22: USB Device Connection**

**Step 3: Insert the device connector.** Once aligned, gently insert the USB device connector into the onboard connector.

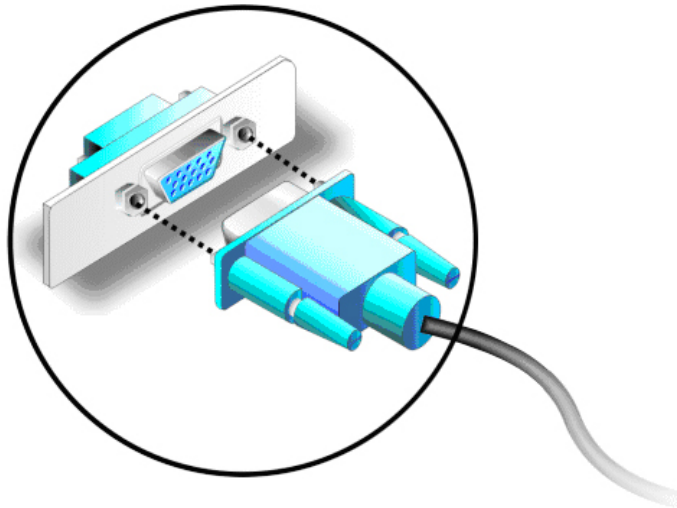
#### 5.9.4 VGA Monitor Connection

The CZGA LX-50 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the CZGA LX-50, please follow the instructions below.

**Step 1: Locate the female DB-15 connector.** The location of the female DB-15 connector is shown in **Chapter 3**.

**Step 2: Align the VGA connector.** Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

**Step 3: Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the CZGA LX-50. See **Figure 5-23**.



**Figure 5-23: VGA Connector**

**Step 4: Secure the connector.** Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

*Intentionally Blank*



Chapter

6

# BIOS Screens

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## 6.1 Introduction

A licensed copy of Phoenix Award BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

### 6.1.1 Starting Setup

The Phoenix Award BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the “**Press Del to enter SETUP**” message appears on the screen.

If the message disappears, restart the computer and try again.

### 6.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the **PAGEUP** and **PAGEDOWN** keys to change entries, press **F1** for help and press **Esc** to quit. Navigation keys are shown below.

| Key           | Function  |
|---------------|---|
| ↑ Up arrow    | Move to the item above  |
| ↓ Down arrow  | Move to the item below  |
| ← Left arrow  | Move to the item on the left hand side  |
| → Right arrow | Move to the item on the right hand side   |
| + /Page up    | Increase the numeric value or make changes  |
| - /Page down  | Decrease the numeric value or make changes  |
| Esc           | Main Menu – Quit and do not save changes into CMOS<br>Status Page Setup Menu and Option Page Setup Menu --<br>Exit current page and return to Main Menu |
| F1            | General help, only for Status Page Setup Menu and Option<br>Page Setup Menu   |

| Key | Function   |
|-----|--|
| F2  | Item help  |
| F5  | Previous values for the page menu items            |
| F6  | Fail-safe defaults for the current page menu items |
| F7  | Optimized defaults for the current page menu items |
| F9  | Menu in BIOS                                       |
| F10 | Save changes and Exit BIOS                         |

**Table 6-1: BIOS Navigation Keys**

### 6.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

### 6.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. To restore CMOS defaults, follow these steps:

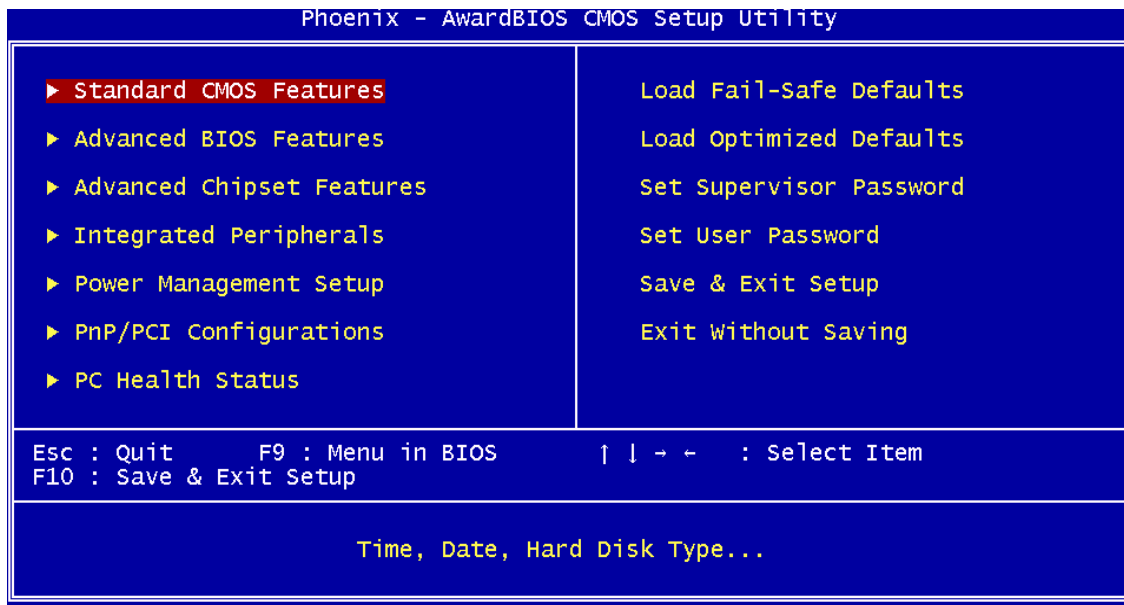
**Step 1:** Unplug the battery connector.

**Step 2:** Remove the battery.

**Step 3:** Plug in the battery connector.

### 6.1.5 Main BIOS Menu

Once the BIOS opens, the main menu (**BIOS Menu 1**) appears.



#### BIOS Menu 1: AwardBIOS CMOS Setup Utility



#### NOTE:

The following sections will completely describe the menus listed below and the configuration options available to users.

The following menu options are seen in **BIOS Menu 1**.

- **Standard CMOS Features:** Changes the basic system configuration.
- **Advanced BIOS Features:** Changes the advanced system settings.
- **Advanced Chipset Features:** Changes the chipset configuration features.
- **Integrated Peripherals:** Changes the settings for integrated peripherals.
- **Power Management Setup:** Configures power saving options.
- **PnP/PCI Configurations:** Changes the advanced PCI/PnP settings.
- **PC Health Status:** Monitors essential system parameters.

The following user configurable options are also available in **BIOS Menu 1**:

**→ Load Fail-Safe Defaults**

Select this option to load failsafe default values for each BIOS parameter in the setup menus. Press **F6** for this operation on any page.

**→ Load Optimized Defaults**

Select this option to load optimal default values for each BIOS parameter in the setup menus. Press **F7** for this operation on any page.

**→ Set Supervisor Password**

By default, no supervisor password is set. To install a supervisor password, select this field and enter the password. After this option is selected, a red dialogue box appears with **"Enter Password: "**. Type the password and press **ENTER**. Retype the original password into the **"Confirm Password: "** dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the **"Enter Password: "** dialogue box, then press any key in the **"Password Disabled !!!"** dialogue box.

**→ Set User Password**

By default no user password is set. To install a user password, select this field and enter the password. After this option is selected, a red dialogue box appears with **"Enter Password: "**. Type the password and press **ENTER**. Retype the original password into the **"Confirm Password: "** dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the **"Enter Password: "** dialogue box, then press any key in the **"Password Disabled !!!"** dialogue box.

**→ Save & Exit Setup**

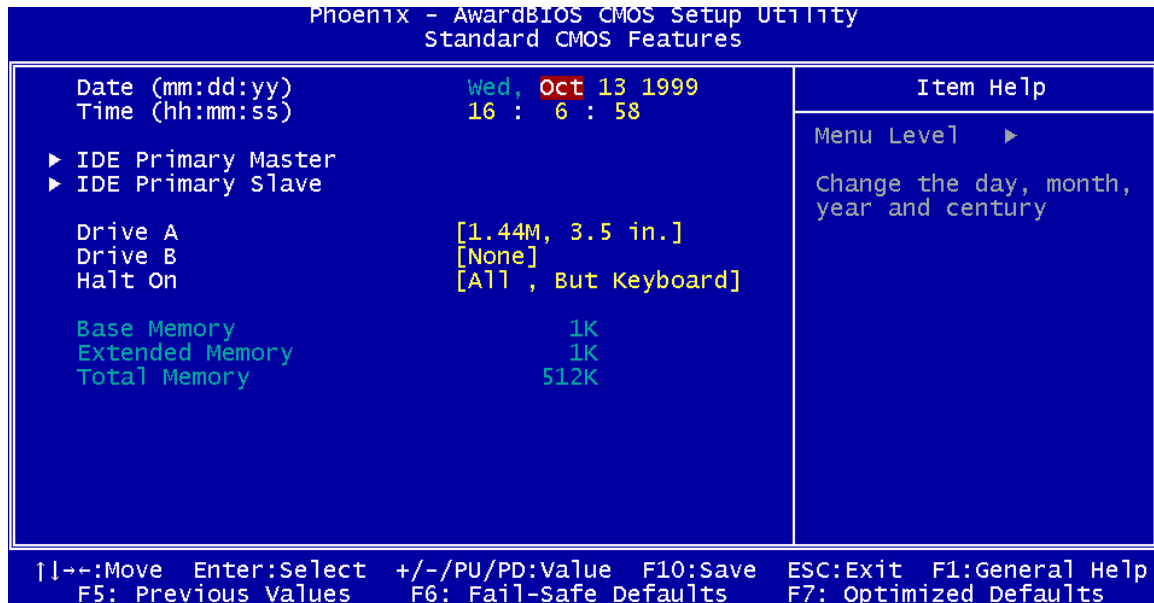
Select this option to save any configuration changes made and exit the BIOS menus.

**→ Exit Without Saving**

Select this option exit the BIOS menus without saving any configuration changes.

## 6.2 Standard CMOS Features

Use the Standard CMOS Features BIOS menu (**BIOS Menu 2**) to set basic BIOS configuration options.



### BIOS Menu 2: Standard CMOS Features

#### → Date [Day mm:dd:yyyy]

The **Date** option sets the system date.

#### → Time [hh/mm/ss]

The **Time** option sets the system time.

#### → IDE Master and IDE Slave

When entering setup, BIOS auto detects the presence of IDE devices. The **Standard CMOS Features** menu shows the status of the auto detected IDE devices. The following IDE devices are detected and shown in the **Standard CMOS Features** menu:

- IDE Primary Master
- IDE Primary Slave

IDE device configurations are changed or set in the IDE Configuration menu (**BIOS Menu 3**). If an IDE device is detected, and one of the above listed two BIOS configuration options is selected, the IDE configuration options shown in **Section 6.2.1** appear.

➔ **Drive A [1.44M, 3.5in]**

Use the **Drive A** configuration option to specify the floppy drive type installed in the system. The floppy drive configuration options are:

- None
- 360K, 5.25 in.
- 1.2M, 5.25 in.
- 720K, 3.5 in.
- 1.44M, 3.5in (Default)
- 2.88M, 3.5 in.

➔ **Drive B [None]**

Use the **Drive B** configuration option to specify the floppy drive type installed in the system. The floppy drive configuration options are:

- None (Default)
- 360K, 5.25 in.
- 1.2M, 5.25 in.
- 720K, 3.5 in.
- 1.44M, 3.5in
- 2.88M, 3.5 in.

➔ **Halt On [All, But Keyboard]**

Use the **Halt On** option to specify what errors detected during the power up process stop the system.

- **All Errors** Whenever BIOS detects a non-fatal error the system is stopped and the user prompted.
- **No Errors** The system boot is not stopped for any errors that may be detected.
- **All, But Keyboard** DEFAULT The system boot does not stop for a keyboard error; it stops for all other errors.
- **All, But Diskette** The system boot does not stop for a disk error; it stops for all other errors.
- **All, But Disk/Key** The system boot does not stop for a keyboard or a disk error; it stops for all other errors.

#### → **Base Memory:**

The **Base Memory** is NOT user configurable. The POST determines the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed, or 640K for systems with 640K or more memory installed.

#### → **Extended Memory**

The **Extended Memory** is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

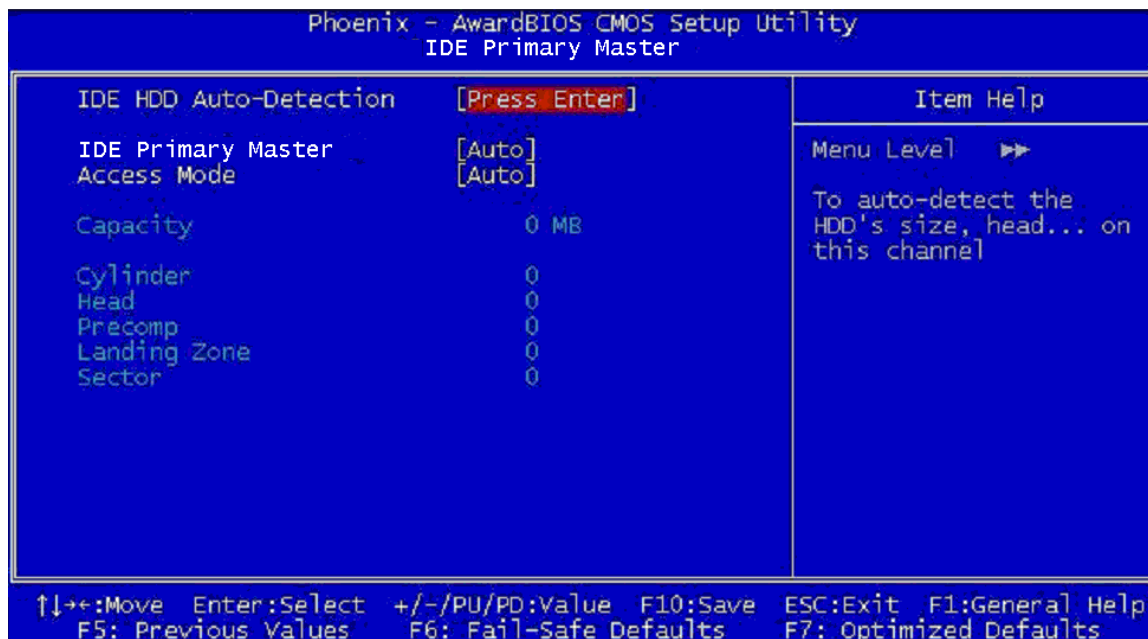
#### → **Total Memory**

The **Total Memory** is NOT user configurable.

### 6.2.1 IDE Primary Master/Slave

Use the **IDE Primary Master/Slave** menu (**BIOS Menu 3**) to set or change the master/slave IDE configurations.





### BIOS Menu 3: IDE Primary Master

#### ➔ IDE HDD Auto-Detection [Press Enter]

Use the **IDE HDD Auto-Detection** option to enable BIOS to automatically detect the IDE settings. Select **IDE HDD Auto-Detection** and press **ENTER**. BIOS automatically detects the HDD type. Do not set this option manually.

#### ➔ IDE Primary Master [Auto]

Use the **IDE Primary Master** option to activate or deactivate the following drive channels:

- Channel 0 Master
- Channel 0 Slave
- Channel 1 Master
- Channel 0 Slave

#### ➔ None

If no drives are connected to the IDE channel select this option. Once set, this IDE channel becomes inaccessible and any drives attached to it are

undetected.

→ **Auto**      DEFAULT      Setting this option allows the device to be automatically detected by the BIOS.

→ **Manual**      Selecting this option allows manual configuration of the device on the IDE channel in BIOS.

→ **Access Mode [Auto]**

The **Access Mode** option can only be configured if the **IDE Primary Master** is set to either **Manual** or **Auto**. Use the **Access Mode** option to determine the hard disk BIOS translation modes. Most systems now use hard drives with large capacities and therefore either the LBA translation mode or auto mode should be selected.

→ **CHS**      Select this mode if the HDD capacity is less than 504MB.

→ **LBA**      Select this mode if the HDD capacity is more than 8.4GB.

→ **Large**      This mode is an extended ECHS mode and while it supports HDDs larger than 504MB, it is not recommended.

→ **Auto**      DEFAULT      If you are unsure of what access mode to set, select this option.

→ **Capacity**

The **Capacity** specification indicates the storage capacity of the HDD installed in the system.

**→ Cylinder**

The **Cylinder** specification indicates how many cylinders (tracks) are on the HDD installed in the system.

**→ Head**

The **Head** specification indicates how many logical heads are on the HDD installed in the system.

**→ Precomp**

The **Precomp** specification indicates on what track the write precompensation begins.

**→ Landing Zone**

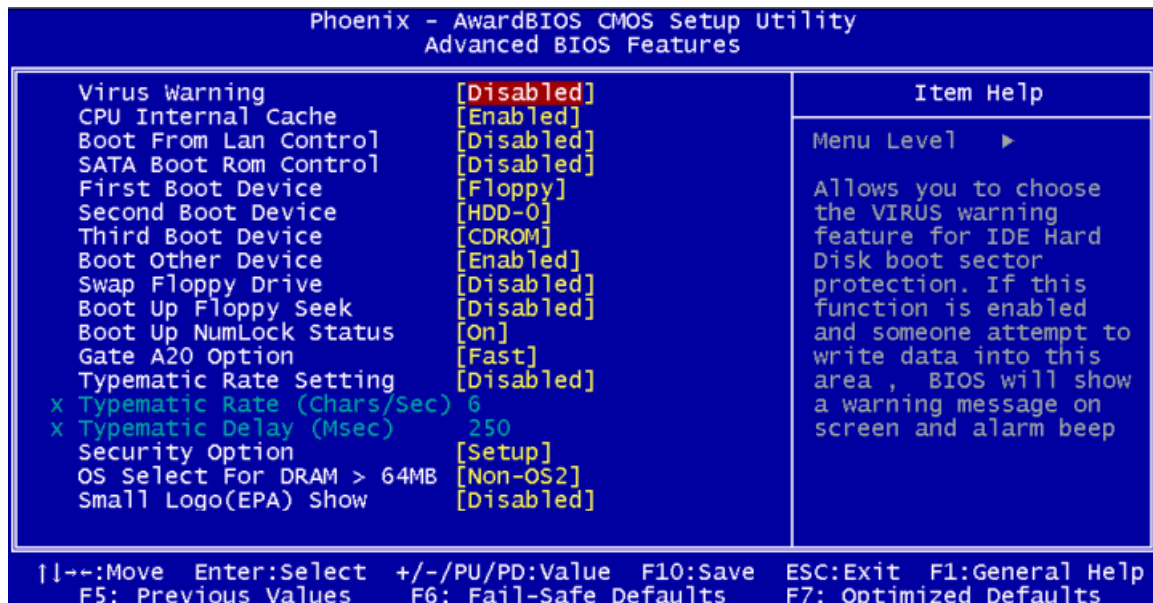
The **Landing Zone** specification indicates where the disk head will park itself after the system powers off.

**→ Sector**

The **Sector** specification indicates how many logical sectors the HDD has been divided into.

## 6.3 Advanced BIOS Features

CPU and peripheral device configuration options are accessed in the **Advanced BIOS Features** menu (**BIOS Menu 4**).



#### BIOS Menu 4: Advanced BIOS Features

##### ➔ Virus Warning [Disabled]



#### NOTE:

Many disk diagnostic programs can cause the above warning message to appear when the program attempts to access the boot sector table. If you are running such a program, it is recommended that the virus protection function be disabled beforehand.

Use the **Virus Warning** option to enable BIOS to monitor the boot sector and partition table of the HDD for any attempted modification. If a modification attempt is made, the BIOS halts the system and an error message appears. If necessary, an anti-virus program can then be run to locate and remove the virus before any damage is done.

→ **Enabled** Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or HDD partition table.

→ **Disabled** DEFAULT No warning message appears when there is an attempt to access the boot sector or HDD partition table.

→ **CPU Internal Cache [Enabled]**

Use the **CPU Internal Cache** option to enable or disable the internal CPU cache.

→ **Disabled** The internal CPU cache is disabled.

→ **Enabled** DEFAULT The internal CPU cache is enabled.

→ **Boot From LAN Control [Disabled]**

Use the **BOOT From LAN Control** option to enable the system to be booted from a remote system.

→ **Disabled** DEFAULT The system cannot be booted from a remote system through the LAN.

→ **Enabled** The system can be booted from a remote system through the LAN.

### → SATA Boot ROM Control [Disabled]

Use the **SATA Boot ROM Control** option to configure SATA IDE use in DOS mode.

- **Disabled**    DEFAULT    Disables SATA IDE use in DOS mode.
- **Enabled**                    Enables SATA IDE use in DOS mode.

### → Boot Device

Use the **Boot Device** options to select the order of the devices the system boots from.

There are three boot device configuration options:

- First Boot Device [Default: Floppy]
- Second Boot Device [Default: HDD-0]
- Third Boot Device [Default: CDROM]

Using the default values, the system first looks for a floppy disk to boot from. If it cannot find a floppy disk, it boots from an HDD. If both the floppy and the HDD are unavailable, the system boots from a CDROM drive.

Boot Device configuration options are:

- Floppy
- LS120
- HDD-0
- SCSI
- CDROM
- HDD-1
- ZIP100
- USB-FDD
- USB-ZIP
- USB-CDROM
- USB-HDD
- LAN
- Disabled

**→ Boot Other Device [Enabled]**

Use the **Boot Other Device** option to determine whether the system uses a second or third boot device if the first boot device is not found.

**→ Disabled** The system does not look for second and third boot devices if the first one is not found.

**→ Enabled** DEFAULT The system looks for second and third boot devices if the first one is not found.

**→ Swap Floppy Drive [Disabled]**

The **Swap Floppy Drive** option is effective only in systems with two floppy drives. Selecting **Enabled** assigns physical drive B to logical drive A, and physical drive A to logical drive B.

**→ Enabled** Assigns physical drive B to logical drive A, and physical drive A to logical drive B.

**→ Disabled** DEFAULT Default physical/logical drive assignments.

**→ Boot Up Floppy Seek [Disabled]**

Use the **Boot Up Floppy Seek** option to enable the BIOS to determine if the floppy disk drive installed has 40 or 80 tracks during the POST. 360K FDDs have 40 tracks while 760K, 1.2M and 1.44M FDDs all have 80 tracks.

**→ Disabled** DEFAULT BIOS does not search for the type of FDD drive by track number. Note that there is no warning message if the drive installed is 360K.

**→ Enabled** BIOS searches for a FDD to determine if it has 40 or 80 tracks. Note that BIOS cannot tell the difference between 720K, 1.2M or 1.44M drives as they all have 80 tracks.

**→ Boot Up Numlock Status [On]**

Use the **Boot Up Numlock Status** option to specify the default state of the numeric keypad.

→ **Off**                                      The keys on the keypad are not activated.

→ **On**                      DEFAULT      Activates the keys on the keypad.

**→ Gate A20 Option [Fast]**

Use the **Gate A20 Option** option to set if the keyboard controller or the chipset controls the Gate A20 switching.

→ **Normal**                                      The keyboard controller does the switching.

→ **Fast**                      DEFAULT      The chipset does the switching.

**→ Typematic Rate Setting [Disabled]**

Use the **Typematic Rate Setting** configuration option to specify if only one character is allowed to appear on the screen if a key is continuously held down. When this option is enabled, the BIOS reports as before, but it then waits a moment, and, if the key is still held down, it begins to report that the key has been pressed repeatedly. This feature accelerates cursor movement with the arrow keys.

→ **Disabled**      DEFAULT      Disables the typematic rate.

→ **Enabled**                                      Enables the typematic rate.

**→ Typematic Rate (Chars/sec) [6]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Rate** option to specify the rate keys are accelerated.



|      |         |                          |
|------|---------|--------------------------|
| → 6  | DEFAULT | 6 characters per second  |
| → 8  |         | 8 characters per second  |
| → 10 |         | 10 characters per second |
| → 12 |         | 12 characters per second |
| → 15 |         | 15 characters per second |
| → 20 |         | 20 characters per second |
| → 24 |         | 24 characters per second |
| → 30 |         | 30 characters per second |

#### → Typematic Delay (Msec) [250]

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Delay** option to specify the delay time between when a key is first pressed and when the acceleration begins.

|        |         |                   |
|--------|---------|-------------------|
| → 250  | DEFAULT | 250 milliseconds  |
| → 500  |         | 500 milliseconds  |
| → 750  |         | 750 milliseconds  |
| → 1000 |         | 1000 milliseconds |

#### → Security Option [Setup]

Use the **Security Option** to limit access to both the system and Setup, or just Setup.

|          |         |  |
|----------|---------|--|
| → Setup  | DEFAULT | The system does not boot and access to Setup is denied if the correct password is not entered at the prompt. |
| → System |         | The system boots, but access to Setup is denied if the   |

correct password is not entered at the prompt.

**NOTE:**

To disable security, select the password setting in the Main Menu.

When asked to enter a password, don't type anything, press **ENTER** and the security is disabled. Once the security is disabled, the system boots and **Setup** can be accessed.

---

➔ **OS Select For DRAM > 64MB [Non-OS2]**

Use the **OS Select For DRAM > 64MB** option to specify the operating system.

- ➔ **OS2** Specifies the operating system used as OS/2.
- ➔ **Non-OS2** DEFAULT Select this option when not using the OS/2 operating system.

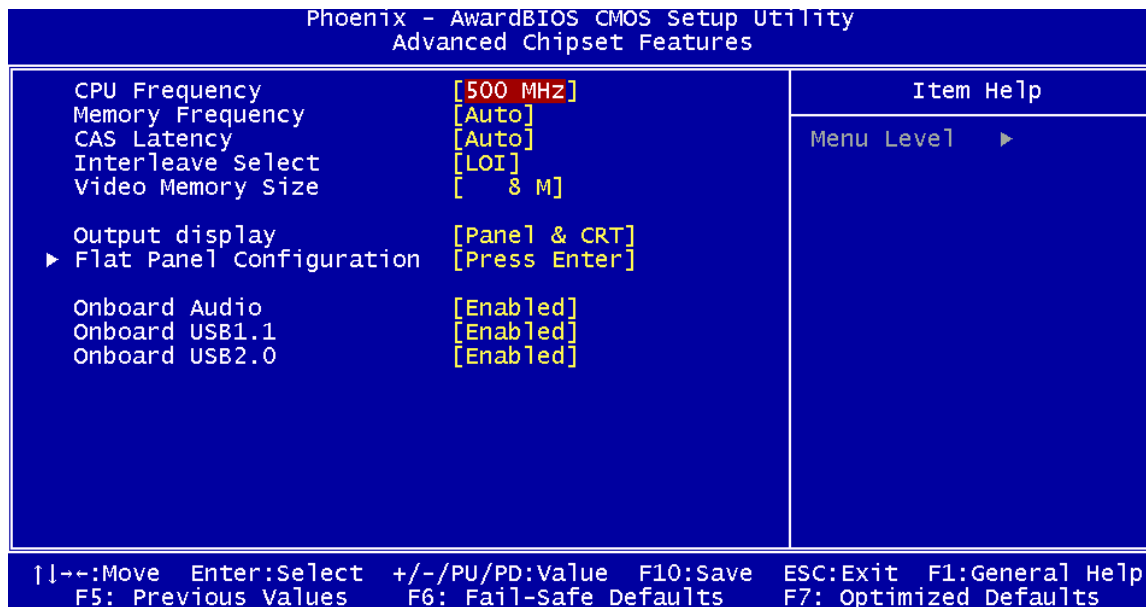
➔ **Small Logo (EPA) Show [Disabled]**

Use the **Small Logo (EPA) Show** option to specify if the Environmental Protection Agency (EPA) logo appears during the system boot-up process. If enabled, the boot up process may be delayed.

- ➔ **Disabled** DEFAULT EPA logo does not appear during boot up.
- ➔ **Enabled** EPA logo appears during boot up.

## 6.4 Advanced Chipset Features

Use the **Advanced Chipset Features** menu (**BIOS Menu 5**) to change chipset configuration options.



### BIOS Menu 5: Advanced Chipset Features

#### → CPU Frequency [500 MHz]

Use the **CPU Frequency** option to set the CPU frequency. The **CPU Frequency** options are:

- Auto
- 200 MHz
- 333 MHz
- 400 MHz
- 433 MHz
- 500MHz (DEFAULT)

**→ Memory Frequency [Auto]**

Use the **Memory Frequency** option to set the frequency of the installed DRAM modules.

The **Memory Frequency** options are:

- Auto (DEFAULT)
- DDR 200
- DDR 266
- DDR 333

**→ CAS Latency [Auto]**

Use the **CAS Latency Time** option to set the Column Address Strobe (CAS) delay time.

The **CAS Latency Time** options are:

- Auto (DEFAULT)
- 1.5 nanoseconds
- 2.0 nanoseconds
- 2.5 nanoseconds
- 3.0 nanoseconds
- 3.5 nanoseconds

**→ Interleave Select [LOI]**

Use the **Interleave Select** option to specify how the cache memory is interleaved.

→ **LOI**      DEFAULT      Low order interleaving (LOI) of memory occurs.

→ **HOI**      High order interleaving (HOI) of memory occurs.

**→ Video Memory Size [8 M]**

Use the **Video Memory Size** option to determine how much memory is allocated to the video graphics device. The **Video Memory Size** options are:

- None
- 8 M (DEFAULT)
- 16 M

- 32 M
- 64 M
- 128 M
- 254 M

#### → Output Display [Panel & CRT]

Use the **Output Display** configuration to specify the display devices the system is connected to. The **Output Display** options are:

- Flat Panel
- CRT
- Panel & CRT (DEFAULT)

#### → Flat Panel Configuration [Press Enter]

Use the **Flat Panel Configuration** option to open the Flat Panel Configuration menu. The **Flat Panel Configuration** options are shown in **Section 6.4.1**.

#### → OnBoard Audio [Enabled]

Use the **OnBoard Audio** option to enable or disable the onboard codec.

- **Enabled**      DEFAULT      The onboard codec is detected and enabled.
- **Disabled**                      The onboard codec is disabled.

#### → Onboard USB1.1 [Enabled]

Use the **Onboard USB1.1** option to enable or disable the onboard USB 1.1 controller.

- **Enabled**      DEFAULT      Onboard USB 1.1 controller enabled.
- **Disabled**                      Onboard USB 1.1 controller disabled.

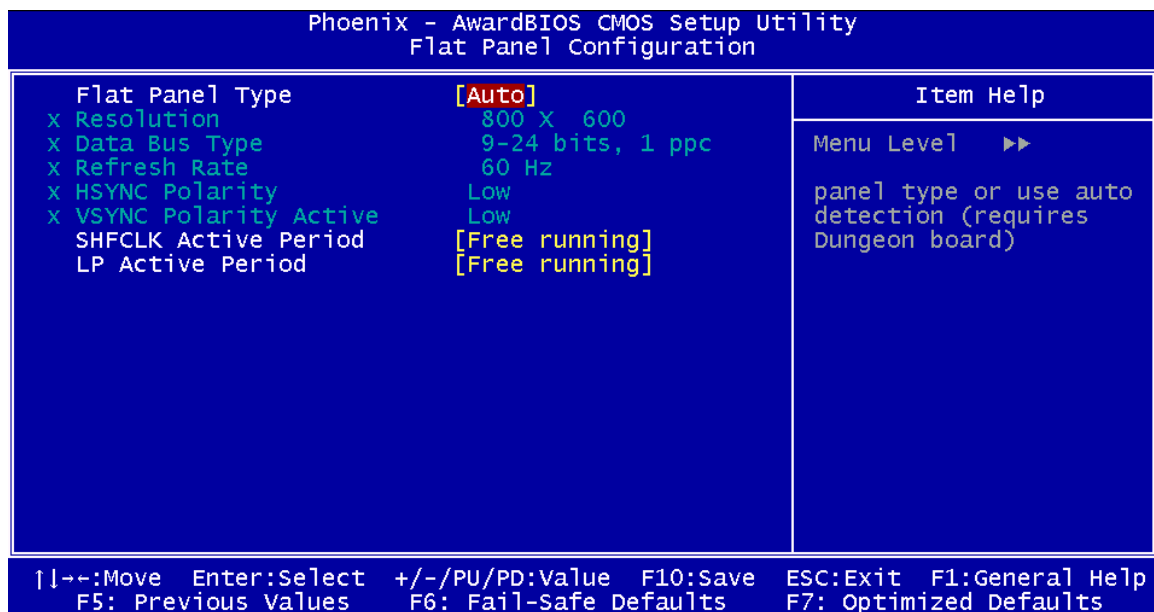
#### → Onboard USB2.0 [Enabled]

Use the **Onboard USB2.0** option to enable or disable the onboard USB 2.0 controller.

- ➔ **Enabled**      DEFAULT      Onboard USB 2.0 controller enabled.
- ➔ **Disabled**                      Onboard USB 2.0 controller disabled.

### 6.4.1 Flat Panel Configuration

Use the **Flat Panel Configuration** menu (**BIOS Menu 6**) to set the configuration settings for the flat panel screen connected to the system.



#### BIOS Menu 6: Flat Panel Configuration

##### ➔ Flat Panel Type [Auto]

Use the **Flat Panel Type** option to specify the type of flat panel screen connected to the system.

- ➔ **TFT**                      Specifies the system is connected to a TFT display.
- ➔ **LVDS**                      Specifies the system is connected to an LVDS display.
- ➔ **Auto**      DEFAULT      The system detects the display type and the display settings.

**→ Resolution [800 x 600]**

The **Resolution** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Resolution** option to set the resolution of the flat panel screen connected to the system. The **Resolution** options are:

- 320 x 240
- 640 x 480
- 800 x 600 (DEFAULT)
- 1024 x 768
- 1152 x 864
- 1280 x 1024
- 1600 x 1200

**→ Data Bus Type [9 – 24 bits, 1 ppc]**

The **Data Bus Type** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Data Bus Type** option to set the bus type and the data bus width used to transfer data between the system and the flat panel screen connected to the system. The **Data Bus Type** options are:

- 9-24 bits, 1 ppc (DEFAULT)
- 18, 24 bits, 2 ppc

**→ Refresh Rate [60 Hz]**

The **Refresh Rate** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Refresh Rate** option to set the screen refresh rate required by the panel connected to the system. Check the documentation that came with the panel before setting this option. The **Refresh Rate** options are:

- 60 Hz (DEFAULT)
- 70 Hz
- 72 Hz
- 75 Hz
- 85 Hz
- 90 Hz
- 100 Hz

➔ **HSYNC Polarity [Low]**

The **HSYNC Polarity** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **HSYNC Polarity** option to set the polarity of the HSYNC signal to the panel. The **HSYNC Polarity** options are:

- High
- Low (DEFAULT)

➔ **VSYNC Polarity Active [Low]**

The **VGSYNC Polarity Active** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **VGSYNC Polarity Active** option to set the polarity of the VSYNC signal to the panel. The **VGSYNC Polarity Active** options are:

- High
- Low (DEFAULT)

➔ **SHFCLK Active Period [Free Running]**

Use the **SHFCLK Active Period** option to set the SHFCLK. The **SHFCLK Active Period** options are:

- Active Only
- Free running (DEFAULT)

➔ **LP Active Period [Free Running]**

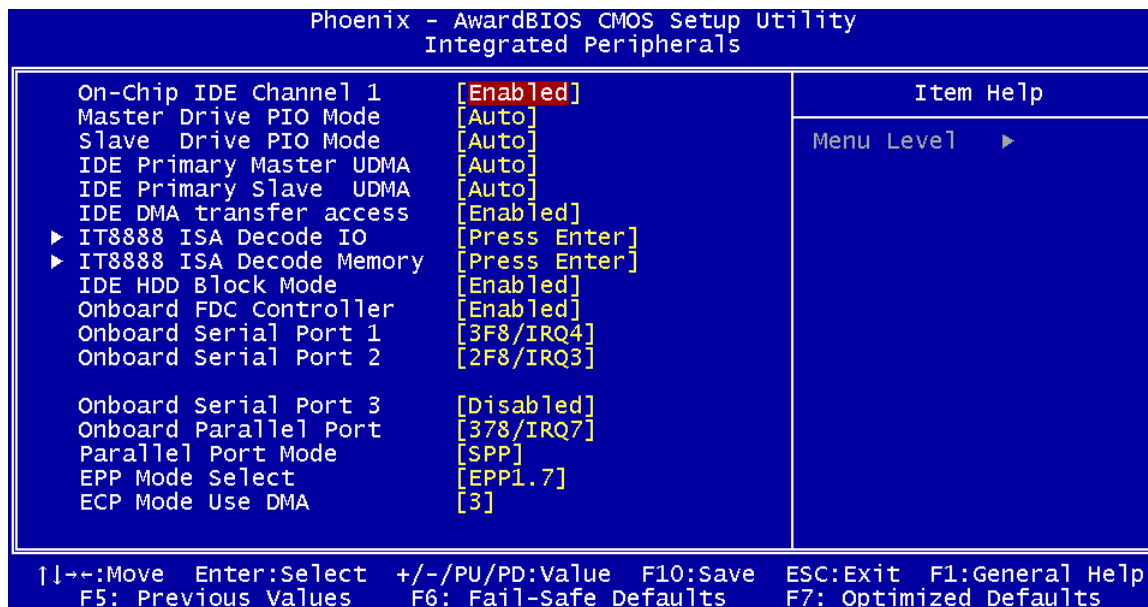
Use the **LP Active Period** option to set the LDE/MOD signal to the panel. The **LP Active Period** options are:



- Active Only
- Free running (DEFAULT)

## 6.5 Integrated Peripherals

Use the Integrated Peripherals menu (**BIOS Menu 7**) to change the configuration options for the attached peripheral devices.



### BIOS Menu 7: Integrated Peripherals

#### ➔ On-Chip IDE Channel 1 [Enabled]

The **On-Chip IDE Channel 1** option is enabled and is NOT user configurable.

#### ➔ Drive PIO Mode [Auto]

Use the **Drive PIO Mode** options below to select the Programmed Input/Output (PIO) mode for the following HDDs:

- Master Drive PIO Mode
- Slave Drive PIO Mode

- **Auto**      DEFAULT      The computer selects the correct mode.
- **Mode 0**                      PIO mode 0 selected with a maximum transfer rate of 3.3MBps.
- **Mode 1**                      PIO mode 1 selected with a maximum transfer rate of 5.2MBps.
- **Mode 2**                      PIO mode 2 selected with a maximum transfer rate of 8.3MBps.
- **Mode 3**                      PIO mode 3 selected with a maximum transfer rate of 11.1MBps.
- **Mode 4**                      PIO mode 4 selected with a maximum transfer rate of 16.6MBps.

→ **IDE UDMA [Auto]**

Use the **IDE UDMA** option below to select the Ultra DMA (UDMA) mode for the following HDDs:

- IDE Primary Master UDMA
- IDE Primary Slave UDMA

- **Disabled**                      The UDMA for the HDD device is disabled.
- **Auto**              DEFAULT      The computer selects the correct UDMA.

→ **IDE DMA transfer access [Enabled]**

Use the **IDE DMA transfer access** option to enable or disable DMA support for IDE devices connected to the system.

- **Disabled**                      All IDE drive DMA transfers are disabled. The IDE drives use PIO mode transfers.
- **Enabled**              DEFAULT      All IDE drive DMA transfers are enabled.

**→ IT8888 ISA Decode IO [Press Enter]**

Press Enter to open the **IT8888 ISA Decode I/O** menu. The **IT8888 ISA Decode I/O** options are shown in **Section 6.5.1**.

**→ IT8888 ISA Decode Memory [Press Enter]**

Press Enter to open the **IT8888 ISA Decode Memory** menu. The **IT8888 ISA Decode Memory** options are shown in **Section 6.5.2**.

**→ IDE HDD Block Mode [Enabled]**

If the drive connected to the system supports block mode, use the **IDE HDD Block Mode** option to enable the system to detect the optimal number of block read/writes per sector the system IDE drive can support. Block mode is also called block transfer, multiple commands, or multiple sector read/write.

**→ Disabled** Block mode is not supported.

**→ Enabled** DEFAULT Block mode is supported.

**→ Onboard FDC Controller [Enabled]**

Use the **Onboard FDC Controller** option to enable or disable the onboard floppy controller. If the system is not connected to a floppy disk or uses an adapter for the FDD, this option can be disabled.

**→ Disabled** The FDD controller is disabled.

**→ Enabled** DEFAULT The FDD controller is enabled.

**→ Onboard Serial Port 1 [3F8/IRQ4]**

Use the **Onboard Serial Port 1** option to select the I/O address and IRQ for the onboard serial port 1. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 1** options are:

■ Disabled

- 3F8/IRQ4 (DEFAULT)
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

→ **Onboard Serial Port 2 [2F8/IRQ3]**

Use the **Onboard Serial Port 2** option to select the I/O address and IRQ for the onboard serial port 2. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 2** options are:

- Disabled
- 3F8/IRQ4
- 2F8/IRQ3 (DEFAULT)
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

→ **Onboard Serial Port 3 [Disabled]**

Use the **Onboard Serial Port 3** option to select the I/O address and IRQ for the onboard serial port 3. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 3** options are:

- Disabled (DEFAULT)
- 3F8/IRQ4
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3

→ **Onboard Parallel Port [378/IRQ7]**

Use the **Onboard Parallel Port** option to specify a logical LPT port address and corresponding interrupt for the physical parallel port. The **Onboard Parallel Port** options are:

- Disabled
- 378/IRQ7 (DEFAULT)
- 278/IRQ5
- 3BC/IRQ7

## ➔ Parallel Port Mode [SPP]

Use the **Parallel Port Mode** option to select parallel port operation mode.

➔ **SPP**      DEFAULT      The parallel port operates in the standard parallel port (SPP) mode. This parallel port mode works with most parallel port devices but is slow.

➔ **EPP**      The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.

➔ **ECP**      The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.

➔ **ECP+EPP**      The parallel port is compatible with both ECP and EPP devices.

➔ **Normal**

## ➔ x EPP Mode Select [EPP1.7]

The **EPP Mode Select** option is only available if the **Parallel Port Mode** option is set to EPP mode. Use the **EPP Mode Select** option to select the parallel port mode standard for the parallel port.

→ **EPP1.9** EPP 1.9 is selected as the EPP standard.

→ **EPP1.7** DEFAULT EPP 1.7 is selected as the EPP standard.

→ **x ECP Mode Use DMA [3]**

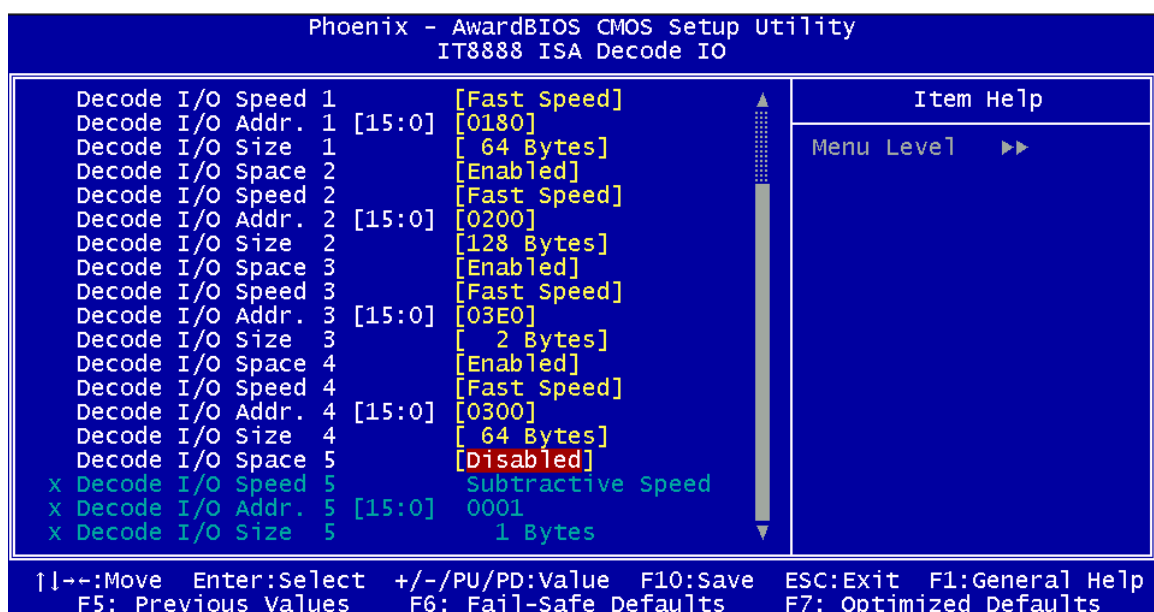
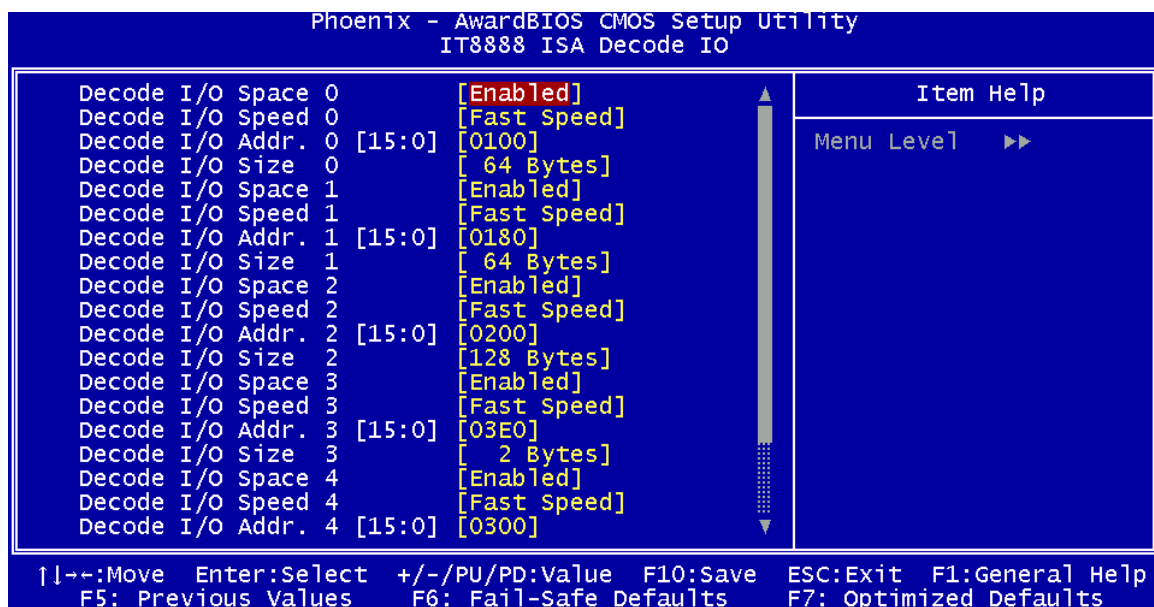
The **ECP Mode Use DMA** option is only available if the **Parallel Port Mode** option is set to ECP mode. Use the **ECP Mode Use DMA** option to specify the DMA channel the parallel port must use in the ECP mode.

→ **1** The parallel port uses DMA Channel 1 in ECP mode.

→ **3** DEFAULT The parallel port uses DMA Channel 3 in ECP mode.

### 6.5.1 IT8888 ISA Decode IO

Use the **IT8888 ISA Decode IO** menu (**BIOS Menu 8**) to set the IO memory range for the onboard ISA.



### BIOS Menu 8: IT8888 ISA Decode IO

The **IT8888 ISA Decode IO** menu has the following common options:

- Decode I/O Space N
- Decode I/O Speed N
- Decode I/O Addr. N [15:0]
- Decode I/O Size N

Where N is an integer in the set [1, 2, 3, 4, 5] and represents a set for the PCI-104 devices that are attached to the system.

➔ **Decode IO Space N [Enabled]**

Use the **Decode IO Space N** option to allocate system resources to the ISA bridge and to enable the Nth PCI-104 to function correctly.

➔ **Disabled**                      The Nth IO set is disabled and the system resources are reallocated to other applications.

➔ **Enabled**      DEFAULT      The Nth IO set is enabled and dedicated system resources are allocated to the Nth ISA bus.

➔ **Decode IO Speed N [Fast Speed]**

Use the **Decode IO Speed N** option to specify the speed of the Nth ISA bus. The following options are available:

- Subtractive Speed
- Slow Speed
- Medium Speed
- Fast Speed      (DEFAULT)

➔ **Decode IO Address N 0:15 [xx]**

Use the **Decode IO Address N 0:15** option to allocate an address to the ISA bus. The address may range from **0001** to **FFFF**.



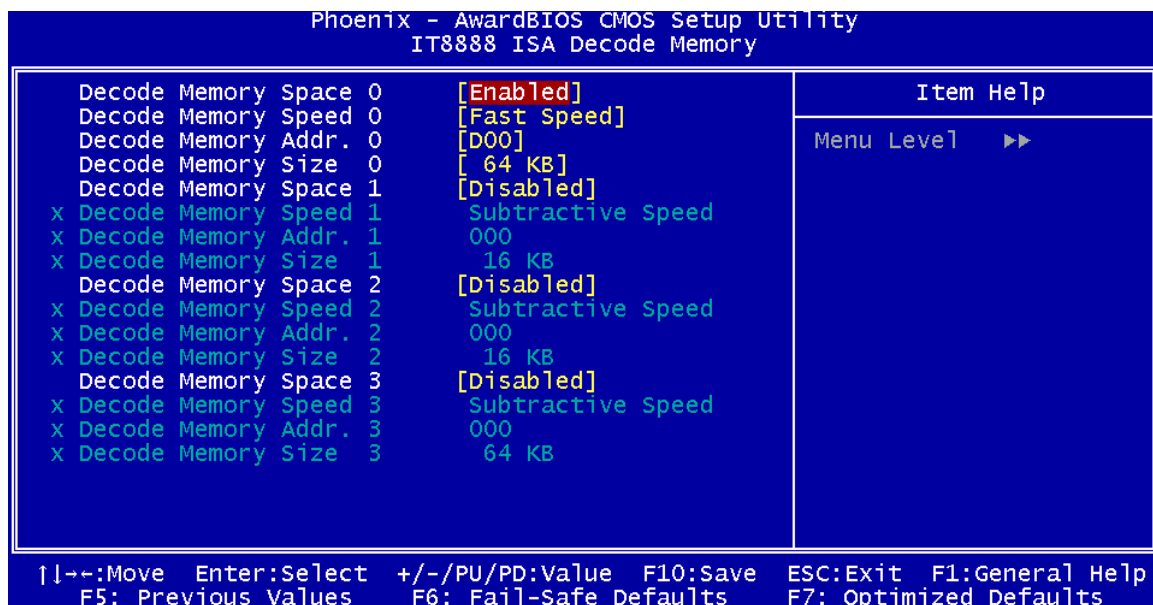
### ➔ Decode IO Size N [Fast Speed]

Use the **Decode IO Size N** option to specify the size of the ISA bus. The following options are available:

- 1 Byte
- 2 Bytes
- 4 Bytes
- 8 Bytes
- 16 Bytes
- 32 Bytes
- 64 Bytes (DEFAULT)
- 128 Bytes

## 6.5.2 IT8888 ISA Decode Memory

Use the **IT8888 ISA Decode Memory (BIOS Menu 9)** to set the resources for the onboard ISA bus.



### BIOS Menu 9: IT8888 ISA Decode Memory

The **IT8888 ISA Decode IO** menu has the following common options:

- Decode Memory Space N
- Decode Memory Speed N
- Decode Memory Addr. N [15:0]
- Decode Memory Size N

Where N is an integer in the set [1, 2, 3, 4, 5] and represents a memory set for the PCI-104 devices that are attached to the system.

➔ **Decode Memory Space N [Enabled]**

Use the **Decode IO Memory N** option to allocate memory resources to the ISA bridge and to enable the PCI-104 to function correctly.

- |   |                 |         |   |
|---|-----------------|---------|---|
| ➔ | <b>Disabled</b> |         | The Nth memory set is disabled and the system memory resources are reallocated to other applications. |
| ➔ | <b>Enabled</b>  | DEFAULT | The Nth memory set is enabled and dedicated system memory resources are allocated to the ISA bus.     |

➔ **Decode Memory Speed N [Fast Speed]**

Use the **Decode Memory Speed N** option to specify the memory speed of the ISA bus. The following options are available:

- Subtractive Speed
- Slow Speed
- Medium Speed
- Fast Speed (DEFAULT)

➔ **Decode Memory Address N [xx]**

Use the **Decode Memory Address N** option to allocate an address to the memory of the ISA bus. The address may range from **0001** to **FFFF**.

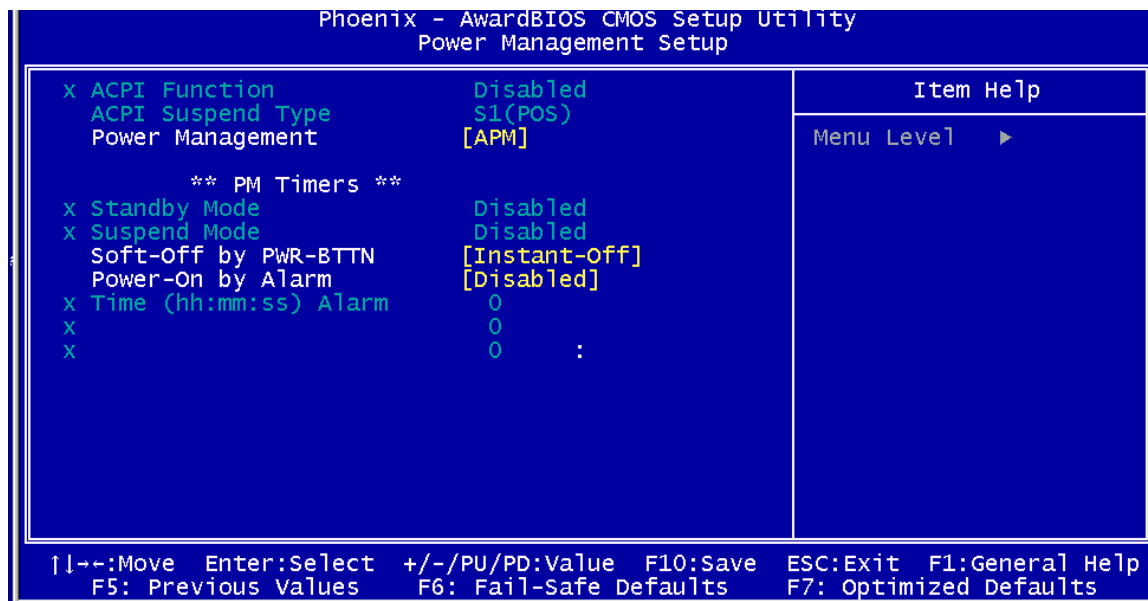
### ➔ Decode Memory Size N [xx]

Use the Decode Memory **Size N** option to specify the memory size of the ISA bus. The following options are available:

- 16 KB
- 32 KB
- 64 KB (DEFAULT)
- 128 KB
- 256 KB
- 512 KB
- 1 MB
- 2 MB

## 6.6 Power Management Setup

Use the **Power Management Setup** menu (**BIOS Menu 10**) to set the BIOS power management and saving features.



### BIOS Menu 10: Power Management Setup

### → x ACPI Function [Disabled]

The **ACPI Function** is enabled when the **Power Management** option is set to ACPI; otherwise, it is disabled.

**Disabled**      DEFAULT      ACPI function disabled

**Enabled**                      ACPI function enabled

### → ACPI Suspend Type [S1 (POS)]

The **ACPI Suspend Type** BIOS option specifies the sleep state the system enters when not being used. Set to S1(POS), the system appears off, the CPU is stopped, RAM is refreshed, and the system is running in a low power mode. This item is not configurable.

### → Power Management [APM]

Use the **Power Management** option to set the power management type used by the system.

→ **Disabled**                      All power management options are turned off. The only user configurable options are the power button and alarm settings.

→ **Legacy**                      Standby and suspend modes can be set.

→ **APM**                      DEFAULT      Advanced power management (APM) is activated

→ **ACPI**                      Advanced Configuration and Power Interface (ACPI) is activated.

### → x Standby Mode [Disabled]

The **Standby Mode** option can only be selected if the **Power Management** option is set to **Legacy**. The **Standby Mode** specifies the amount of time the system can be inactive before the system enters standby mode. The **Standby Mode** options are:

- Disabled (DEFAULT)
- 1 Sec
- 5 Sec
- 10 Sec
- 15 Sec
- 30 Sec
- 45 Sec
- 1 Min
- 5 Min
- 10 Min
- 15 Min
- 30 Min
- 45 Min
- 60 Min
- 90 Min
- 120 Min

➔ **x Suspend Mode [Disabled]**

The **Suspend Mode** option can only be selected if the **Power Management** option is set to Legacy. The **Suspend Mode** specifies the amount of time the system can be inactive before the system enters suspend mode. The **Suspend Mode** options are:

- Disabled (DEFAULT)
- 1 Sec
- 5 Sec
- 10 Sec
- 15 Sec
- 30 Sec
- 45 Sec
- 1 Min
- 5 Min
- 10 Min
- 15 Min
- 30 Min

- 45 Min
- 60 Min
- 90 Min
- 120 Min

➔ **Soft-Off by PWR-BTTN [Instant-Off]**

Use the **Soft-Off by PWR-BTTN** option to enable the system to enter a very low-power-usage state when the power button is pressed.

➔ **Instant-Off**      DEFAULT      When the power button is pressed, the system is immediately shutdown.

➔ **Delay 4-sec**                      To shutdown the system the power button must be held down longer than four seconds otherwise the system enters a low power usage state.

➔ **Power-On by Alarm [Disabled]**

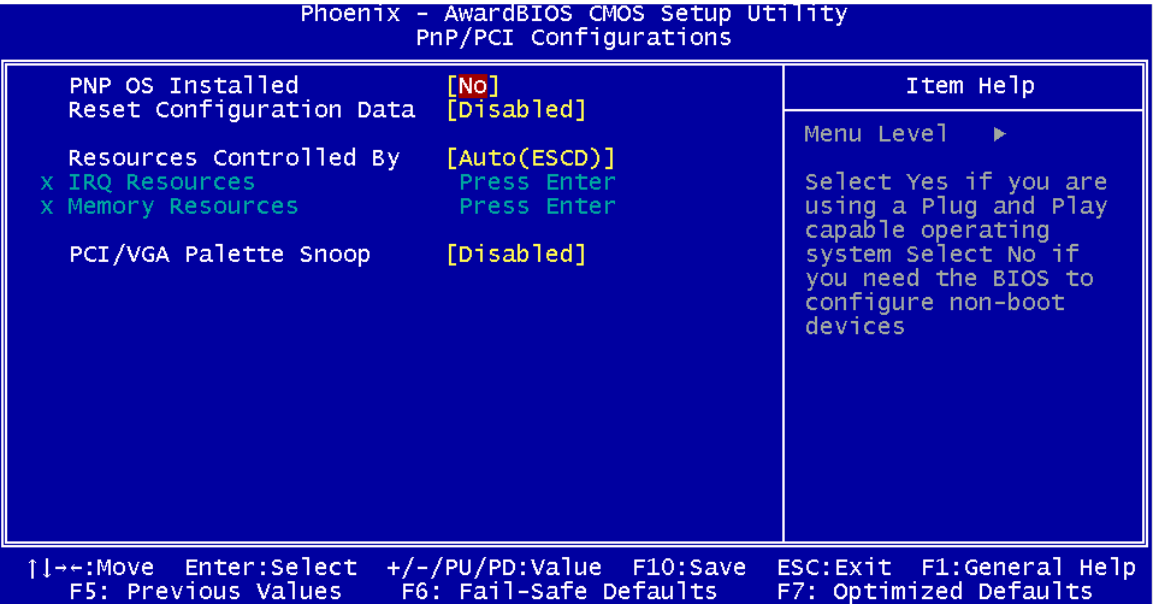
Use the **Power-On by Alarm** to set the time when the system should automatically be turned on.

➔ **Disabled**      DEFAULT      The real time clock (RTC) cannot generate a wake event.

➔ **Enabled**                      If selected, the time (hh:mm:ss) options can be set to specify the exact time the system is roused.

## 6.7 PnP/PCI Configurations

Use the **PnP/PCI Configurations** menu (**BIOS Menu 11**) to set the plug and play, and PCI options.



### BIOS Menu 11: PnP/PCI Configurations

#### ➔ PNP OS Installed [No]

The **PNP OS Installed** option determines whether the Plug and Play devices connected to the system are configured by the operating system or the BIOS.

- ➔ **No**      DEFAULT      If the operating system does not meet the Plug and Play specifications, BIOS configures all the devices in the system.
- ➔ **Yes**                      Set this option if the system is running Plug and Play aware operating systems. The operating system changes the interrupt, I/O, and DMA settings.

**→ Reset Configuration Data [Disabled]**

Use the **Reset Configuration Data** option to reset the Extended System Configuration Data (ESCD) when exiting setup if booting problems occur after a new add-on is installed.

**→ Disabled**      DEFAULT      ESCD will not be reconfigured

**→ Enabled**                      ESCD will be reconfigured after you exit setup

**→ Resources Controlled By [Auto (ESCD)]**

Use the **Resources Controlled By** option to either manually configure all the boot and plug and play devices, or allow BIOS to configure these devices automatically. If BIOS is allowed to configure the devices automatically IRQs, DMA and memory base address fields cannot be set manually.

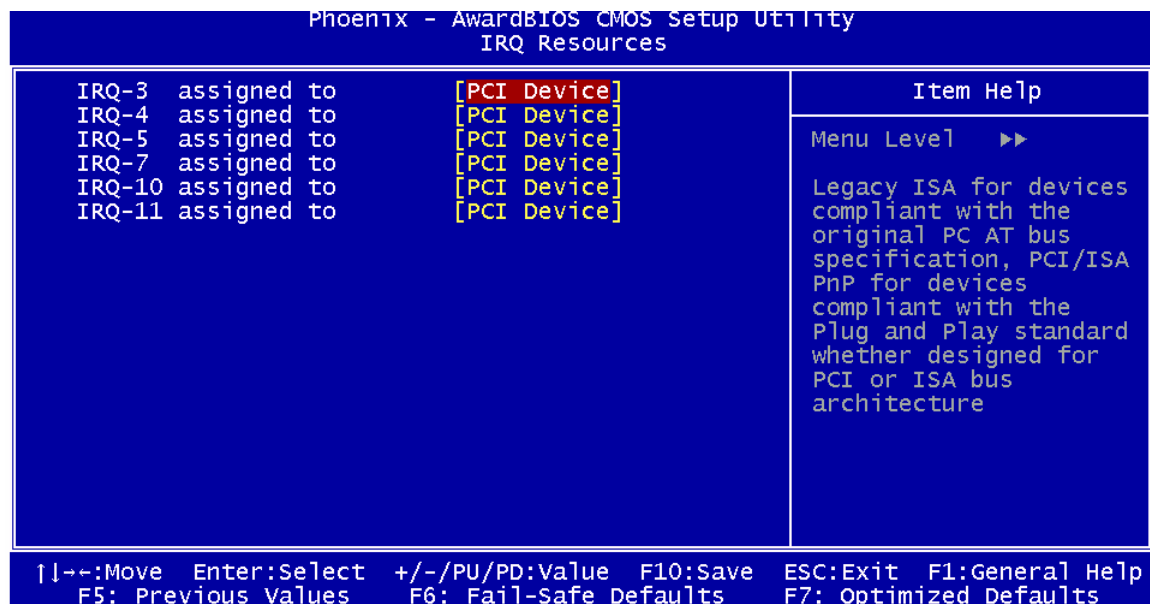
**→ Auto(ESCD)**      DEFAULT      BIOS automatically configures plug and play devices as well as boot devices.

**→ Manual**                      Manually configure the plug and play devices and any other boot devices.

**→ x IRQ Resources [Press Enter]**

The IRQ Resources option (**BIOS Menu 12**) can only be selected if the **Resources Controlled By** option is set to **Manual**.





## BIOS Menu 12: IRQ Resources

The **IRQ Resources** menu has the following options:

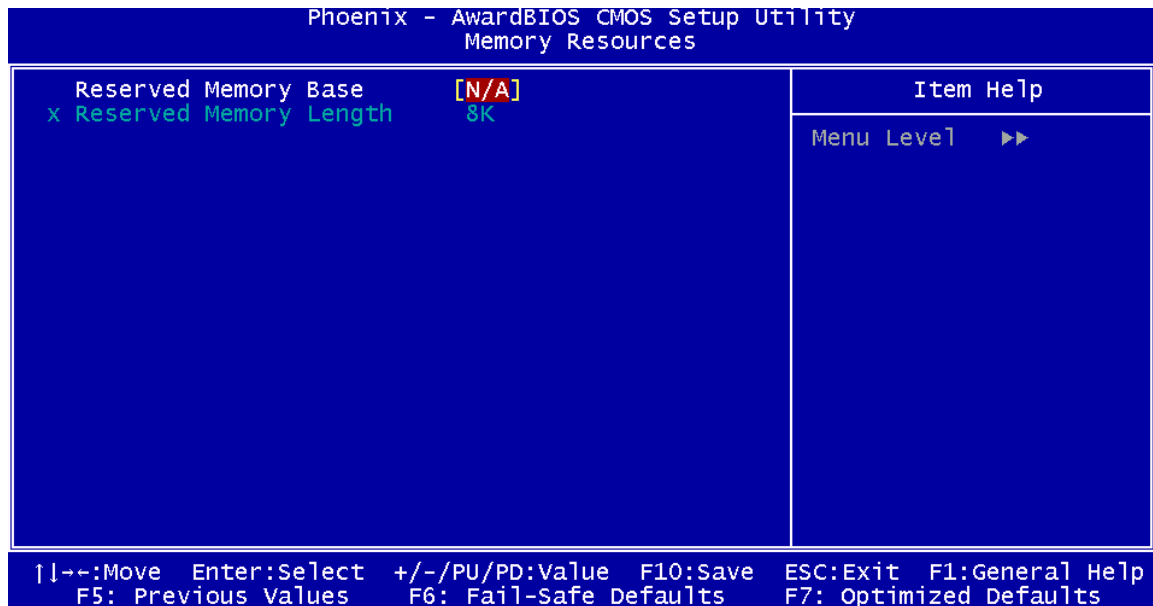
- IRQ-3 assigned to
- IRQ-4 assigned to
- IRQ-5 assigned to
- IRQ-7 assigned to
- IRQ-10 assigned to
- IRQ-11 assigned to

The above options all have the following options.

- ➔ **PCI Device**    DEFAULT    The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PNP for devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture.
- ➔ **Reserved**    The IRQ is reserved by BIOS.

### ➔ x Memory Resources [Press Enter]

The Memory Resources menu (**BIOS Menu 13**) can only be accessed if the Resources Controlled By option is set to Manual. Use Memory Resources to select a base address and the length for the memory area used by a peripheral that requires high memory.



### BIOS Menu 13: Memory Resources

The menu has two configurable options:

- Reserved Memory Base
- Reserved Memory Length

### ➔ Reserved Memory Base [N/A]

The **Reserved Memory Base** option specifies the base address for the peripheral device.

The **Reserved Memory Base** options are:

- N/A (DEFAULT)
- C800
- CC00
- D000

- D400
- D800
- DC00

#### ➔ x Reserved Memory Length [8K]

The **Reserved Memory Length** option can only be accessed if the **Reserved Memory Base** option is **not** set to **N/A**. The **Reserved Memory Length** specifies the amount of memory reserved for the peripheral device. The **Reserved Memory Length** options:

- 8K (DEFAULT)
- 16K
- 32K
- 64K

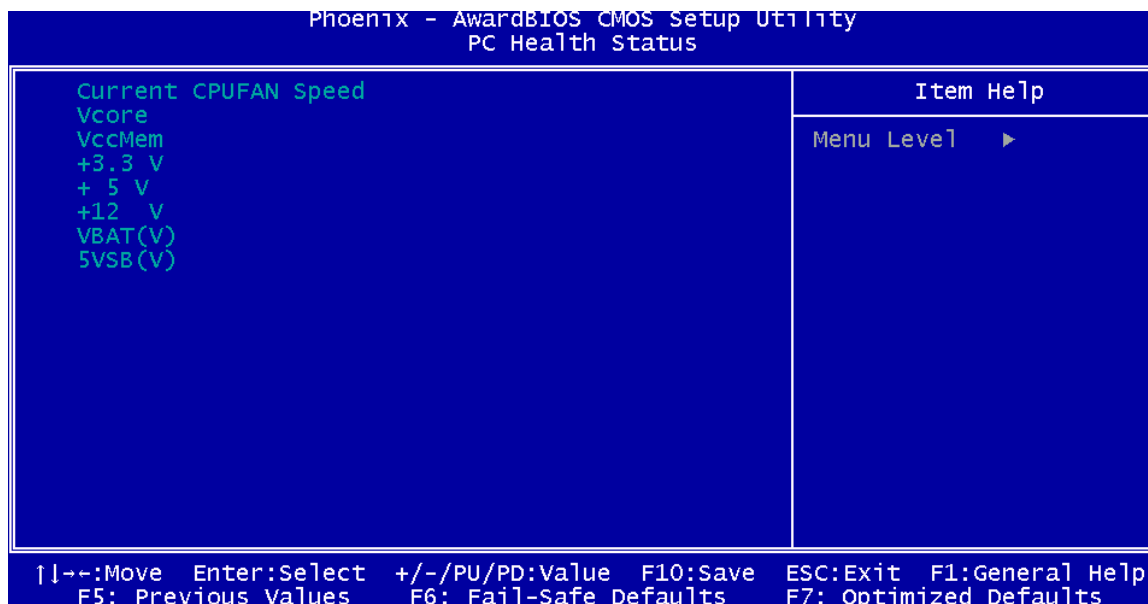
#### ➔ PCI/VGA Palette Snoop [Disabled]

Use the **PCI/VGA Palette Snoop** option enables the system to determine whether or not some special VGA cards, high-end hardware MPEG decoders and other similar devices are allowed to look at the VGA palette on the video card so these devices can determine what colors are in use. This option is needed very rarely and should be left "Disabled" unless a video device specifically requires the setting to be enabled upon installation.

- |                   |         |  |
|-------------------|---------|--|
| ➔ <b>Disabled</b> | DEFAULT | Does not allow the graphics devices to examine the VGA palette on the graphics card. |
| ➔ <b>Enabled</b>  |         | Allows the graphics devices to examine the VGA palette on the graphics card.         |

## 6.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 14**) has two user configurable options, and shows system operating parameters that are essential to the stable operation of the system.



#### BIOS Menu 14: PC Health Status

The following system parameters are monitored by the **PC Health Status** menu:

##### → Fan Speed

The following fan speed is monitored:

- Current CPU Fan Speed

##### → Voltages

The following voltages are monitored:

- Vcore
- VccMem
- +3.3 V
- +5 V
- +12 V
- VBAT (V)
- 5VSB (V)

Chapter

7

# Software Drivers

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## 7.1 Available Software Drivers

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### NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. You may visit the CyberResearch website or contact technical support for the latest updates.

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The CZGA LX-50 CPU card has five software drivers:

- VGA Driver
- Audio Driver
- LAN Driver
- SATA/RAID Driver

## 7.2 ISA Driver

All five drivers can be found on the CD that came with the CPU card. To install the drivers please follow the instructions in the sections below.

Insert the CD into the system that contains the CZGA LX-50 CPU card.

---



### NOTE:

If your system does not run the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (replace **X** with the actual drive letter for your CD-ROM) to access the **Driver CD** main menu.

---

**Step 4:** From the AMD LX/GX Driver CD main menu (**Figure 7-1**), click CZGA LX-50.



Figure 7-1: AMD LX/GX CD Main Menu

**Step 5:** A window appears listing the drivers available for installation (**Figure 7-2**).



**Figure 7-2: AMD LX/GX CD Driver Menu**

**Step 6:** Select any item from the list to view more information on the driver installation.

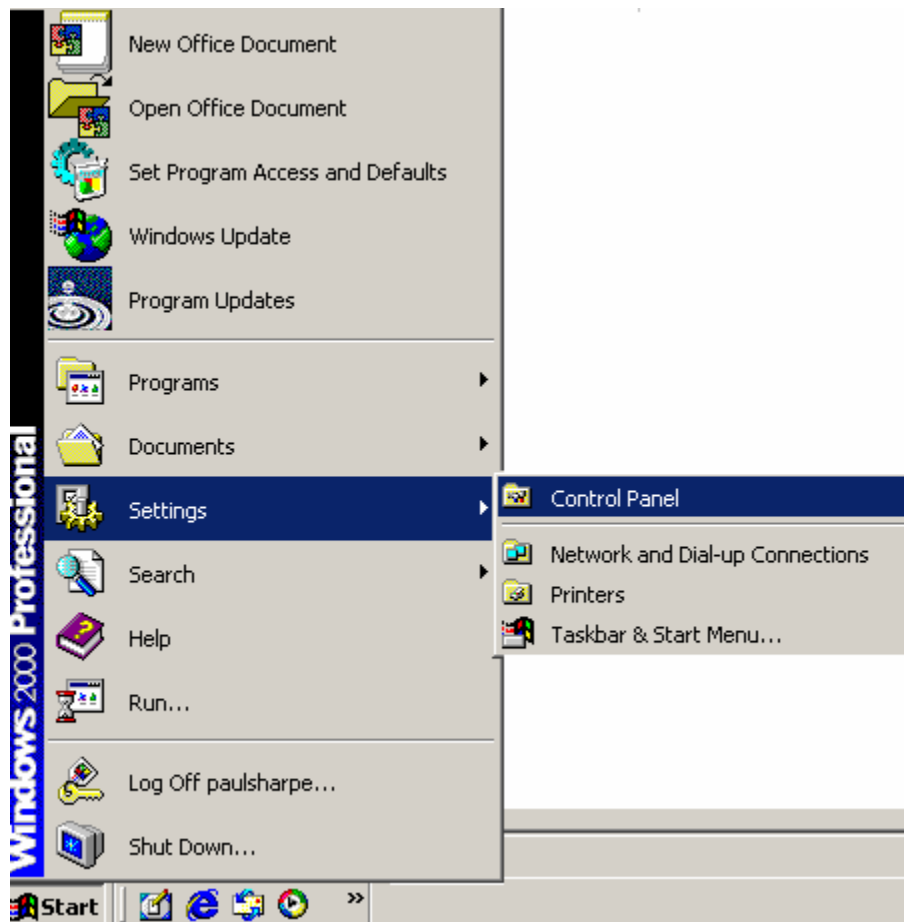
The following sections fully describe the driver installation procedures for the CZGA LX-50 CPU card.



## 7.3 VGA Driver

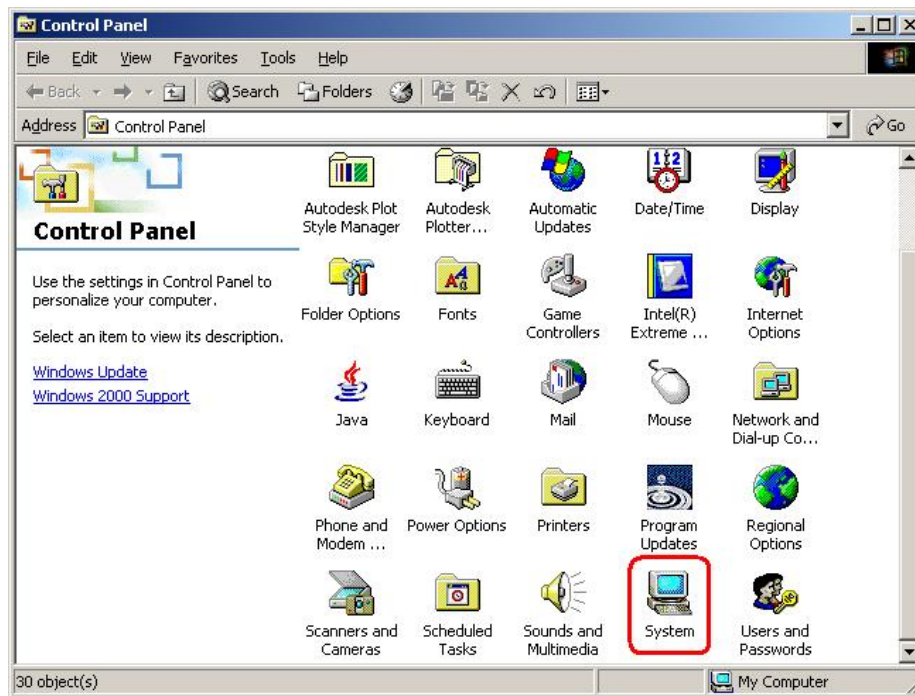
To install the VGA driver follow the steps below.

**Step 1:** Open Windows Control Panel (**Figure 7-3**).



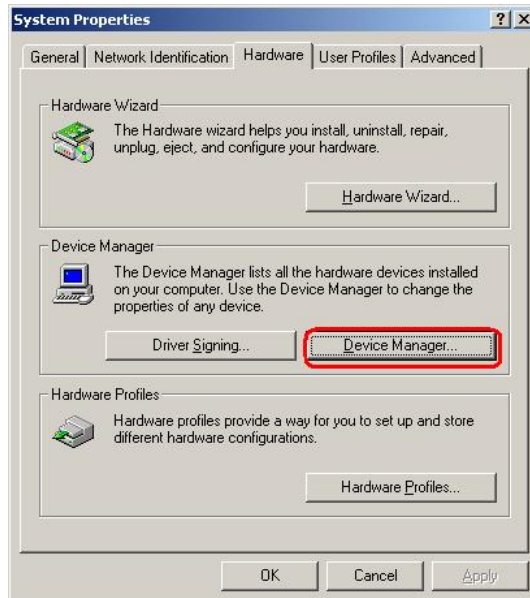
**Figure 7-3: Access Windows Control Panel**

**Step 2:** Double click the **System** icon (Figure 7-4).



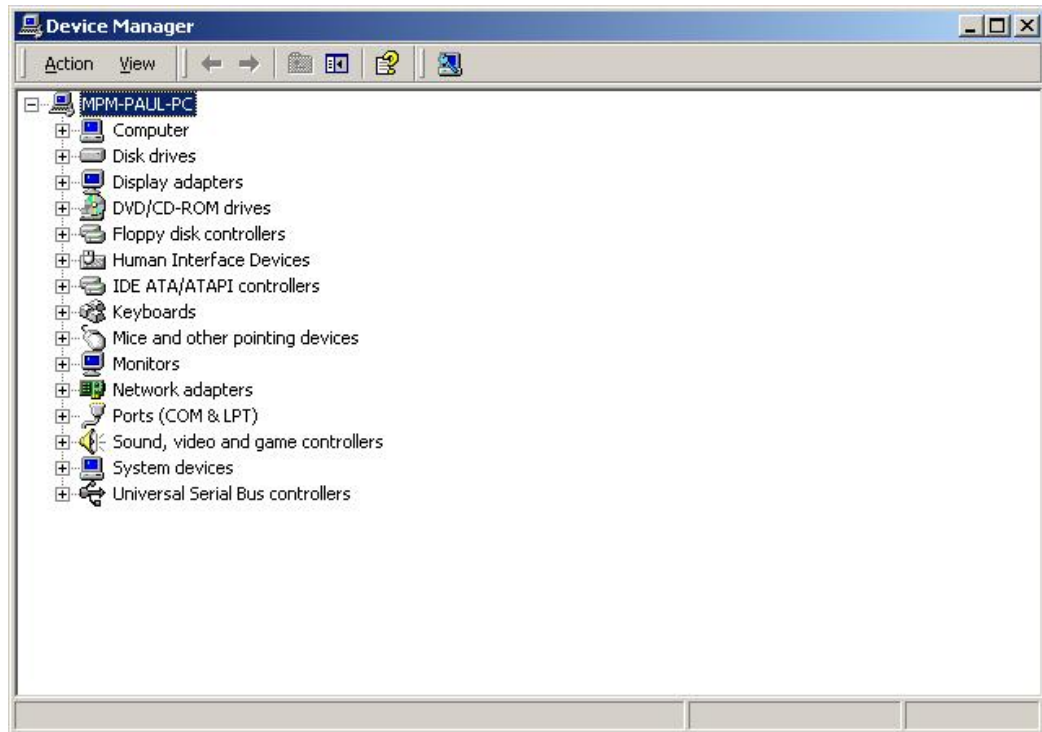
**Figure 7-4: Double Click the System Icon**

**Step 3:** Double click the **Device Manager** tab (Figure 7-5).



**Figure 7-5: Double Click the Device Manager Tab**

**Step 4:** A list of system hardware devices appears (**Figure 7-6**).



**Figure 7-6: Device Manager List**

**Step 5:** Expand the **Display Adapters** category (**Figure 7-7**). Right click the adapter and select **Properties**.



**NOTE:**

If the **Display Adapters** category is not available, navigate to **X:\VGA\LX800\XP\VGA 2.01.05** (where **X:\** is the system CD drive) and read the **ReleaseNotes.txt** file for further information on installing the VGA driver.

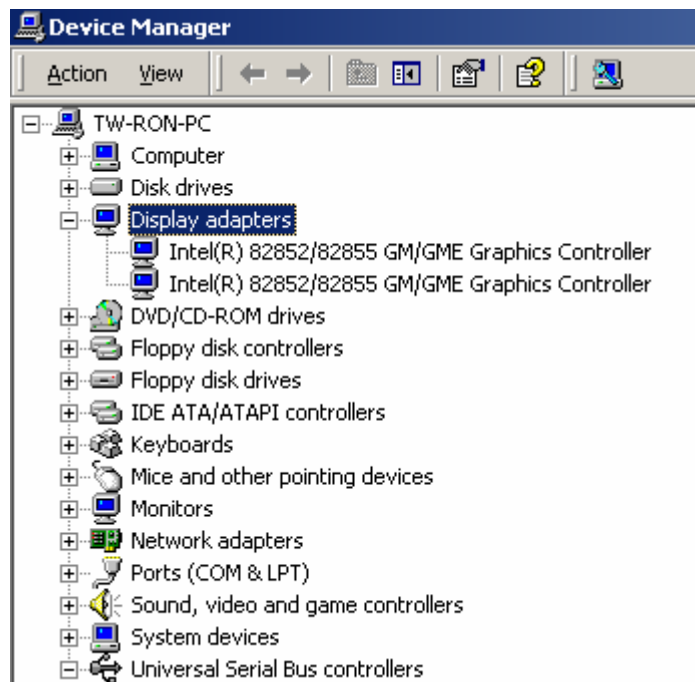
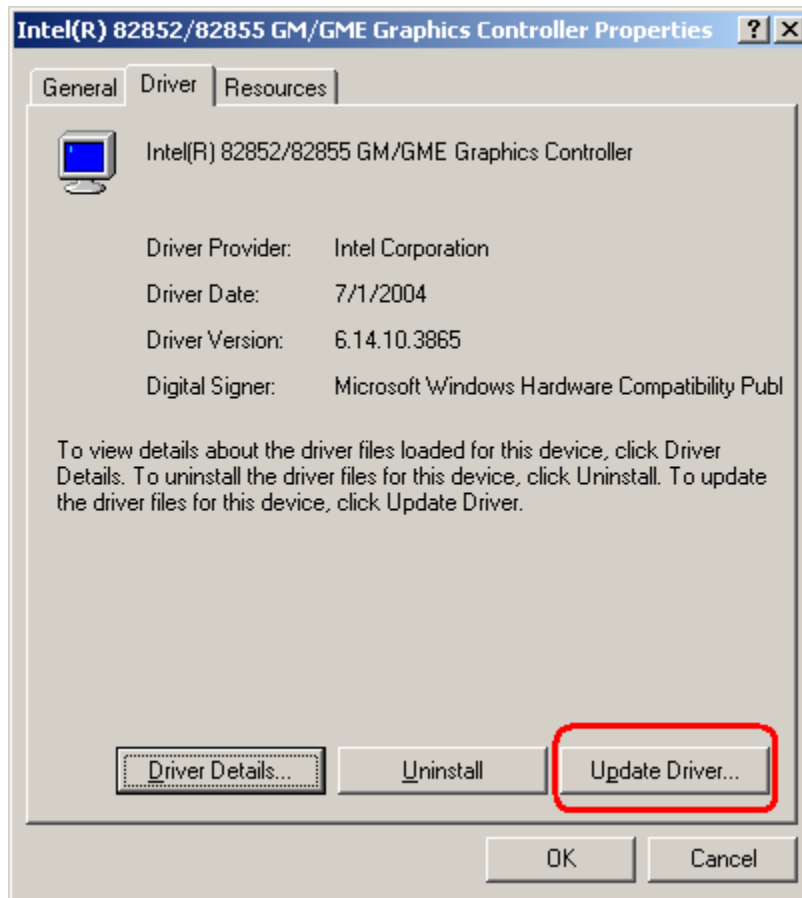


Figure 7-7: Expand the Display Adapters Category

**Step 6:** From the Driver tab of the Properties window, click Update Driver (**Figure 7-8**) or, click Reinstall Driver if Update Driver is not seen.



**Figure 7-8: Update Driver**

**Step 7:** The Upgrade Device Driver Wizard appears (**Figure 7-9**). Click **NEXT** to continue.



**Figure 7-9: Upgrade Device Driver Wizard**

**Step 8:** The Install Hardware Device Driver screen appears (**Figure 7-10**). Select the Search for a suitable driver for my device radio button and click **NEXT** to continue.



**Figure 7-10: Search for Suitable Driver**

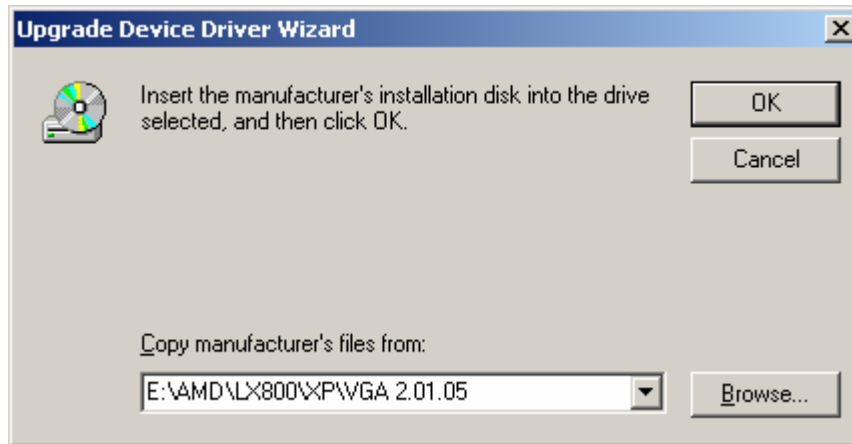


**Step 9:** Select Specify a Location in the Locate Driver Files window (**Figure 7-11**). Click **NEXT** to continue.



**Figure 7-11: Locate Driver Files**

**Step 10:** Click Browse and navigate to the X:\AMD\LX800\XP\VGA 2.01.05 directory, where “X:” is the system CD drive (**Figure 7-12**).



**Figure 7-12: Location Browsing Window**

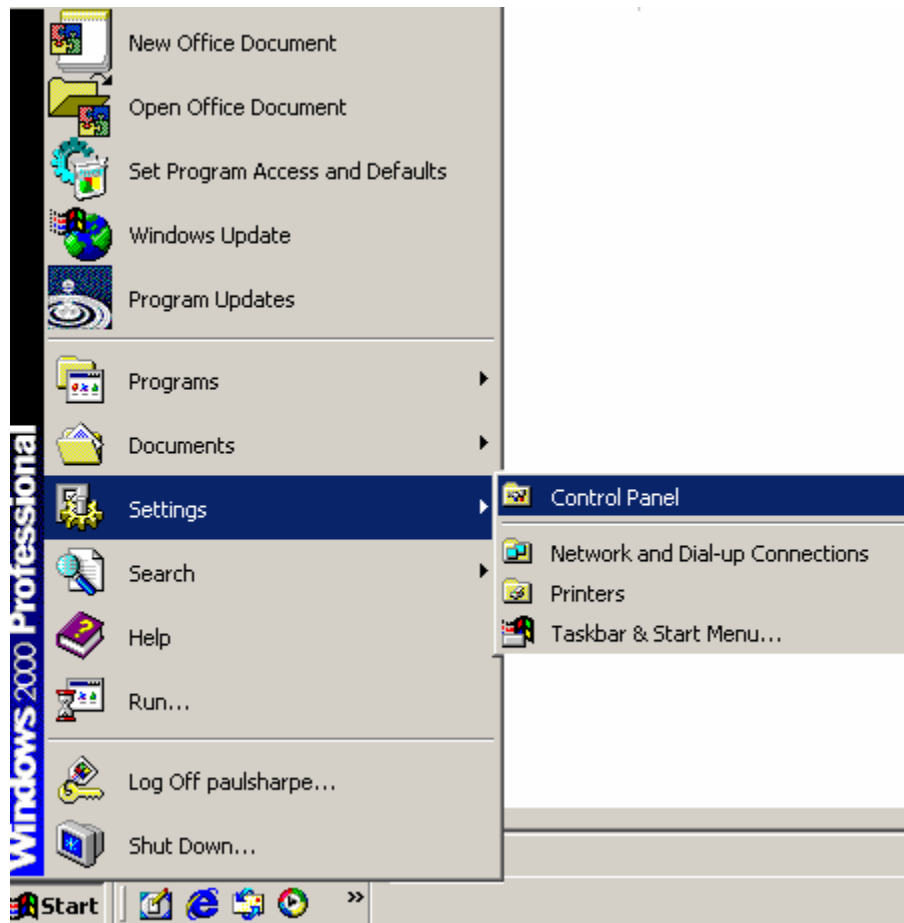
**Step 11:** Click **OK** to continue.

**Step 12:** A driver files location menu window appears. Click **NEXT** to continue. The driver is installed.

## 7.4 Audio Driver Installation

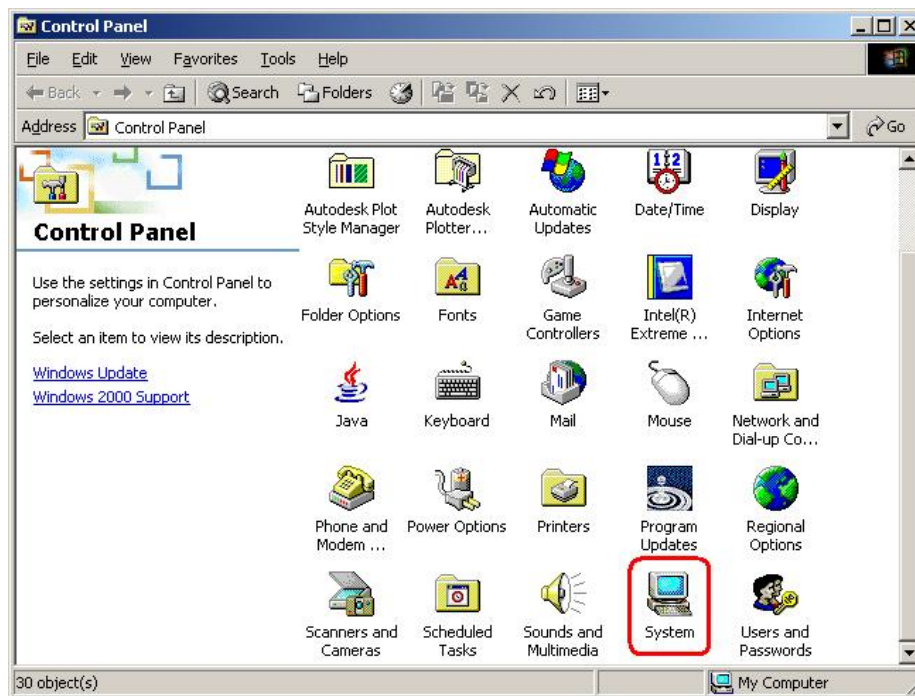
To install the audio driver please follow the steps below.

**Step 1:** Open **Windows Control Panel (Figure 7-13)**.



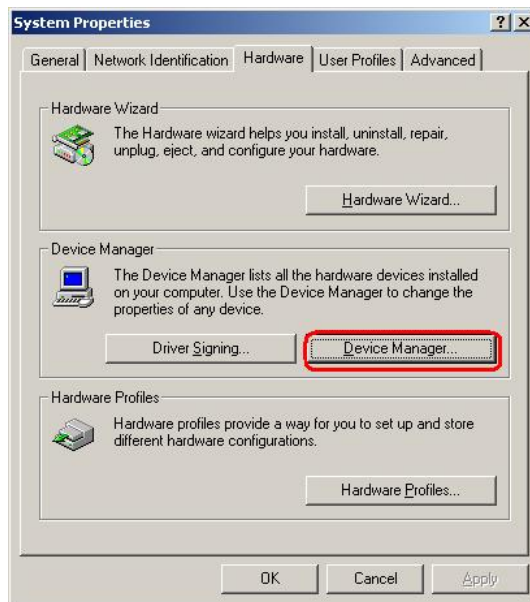
**Figure 7-13: Access Windows Control Panel**

**Step 2:** Double click the System icon (**Figure 7-14**).



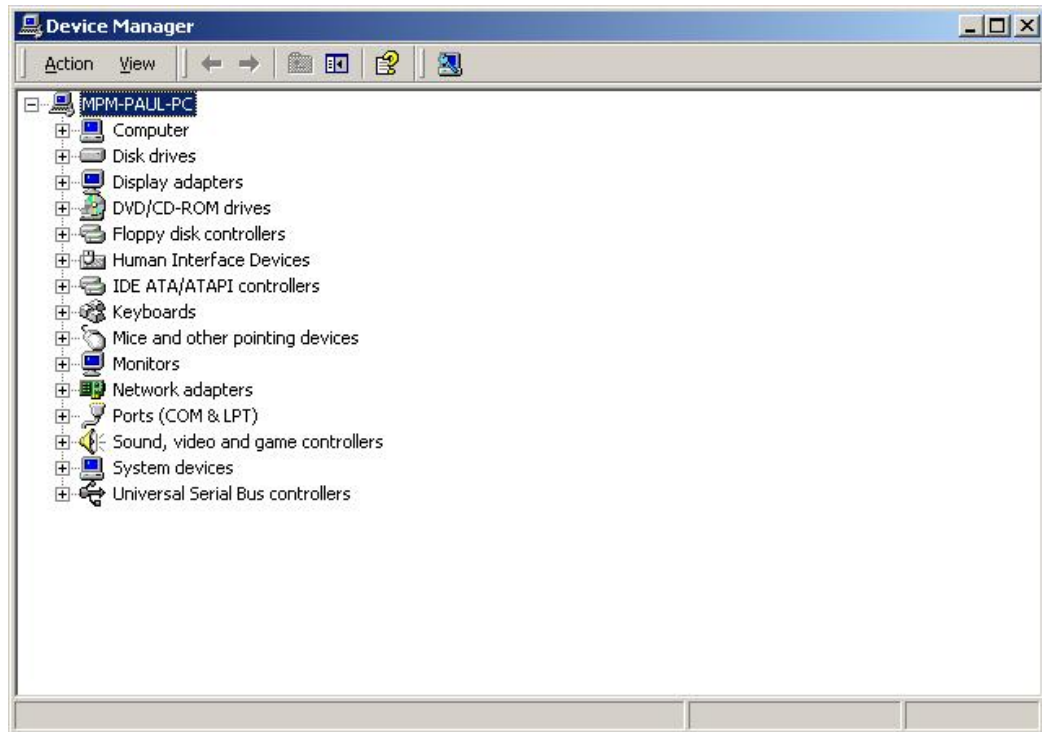
**Figure 7-14: Double Click the System Icon**

**Step 3:** Double click the Device Manager tab (Figure 7-15).



**Figure 7-15: Double Click the Device Manager Tab**

**Step 4:** A list of system hardware devices appears (**Figure 7-16**).



**Figure 7-16: Device Manager List**

**Step 5:** Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

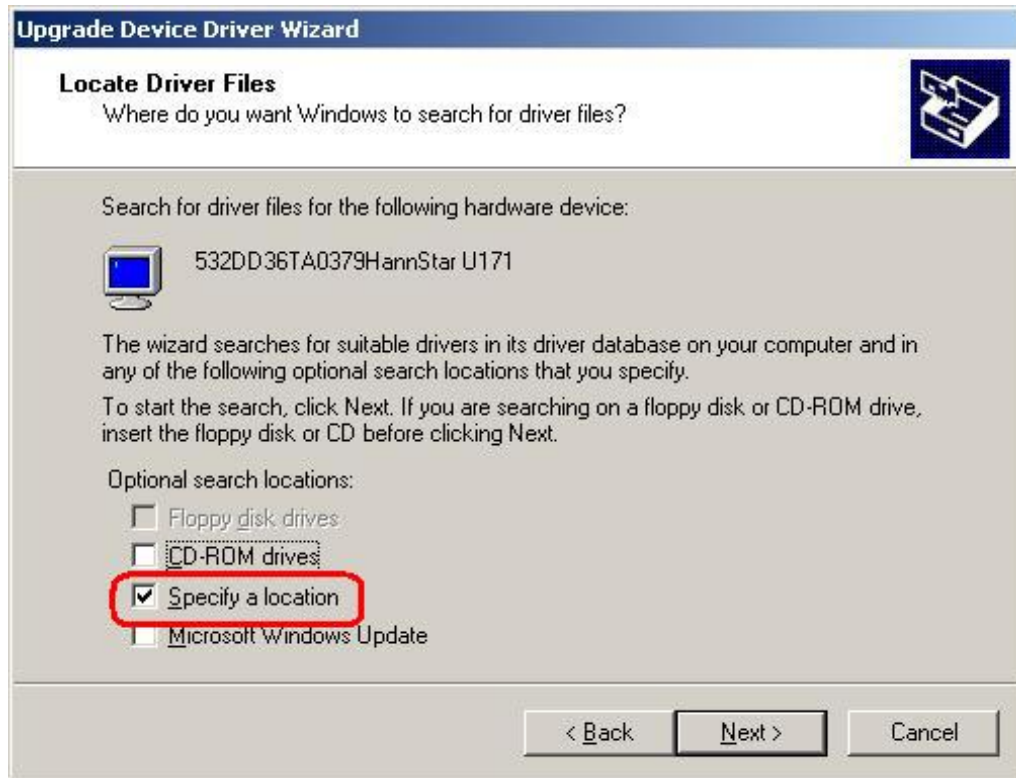
**Step 6:** The **Device Driver Wizard** appears (**Figure 7-17**). Click **NEXT** to continue.



**Figure 7-17: Search for Suitable Driver**

**Step 7:** Select “Specify a Location” in the **Locate Driver Files** window (**Figure 7-18**).

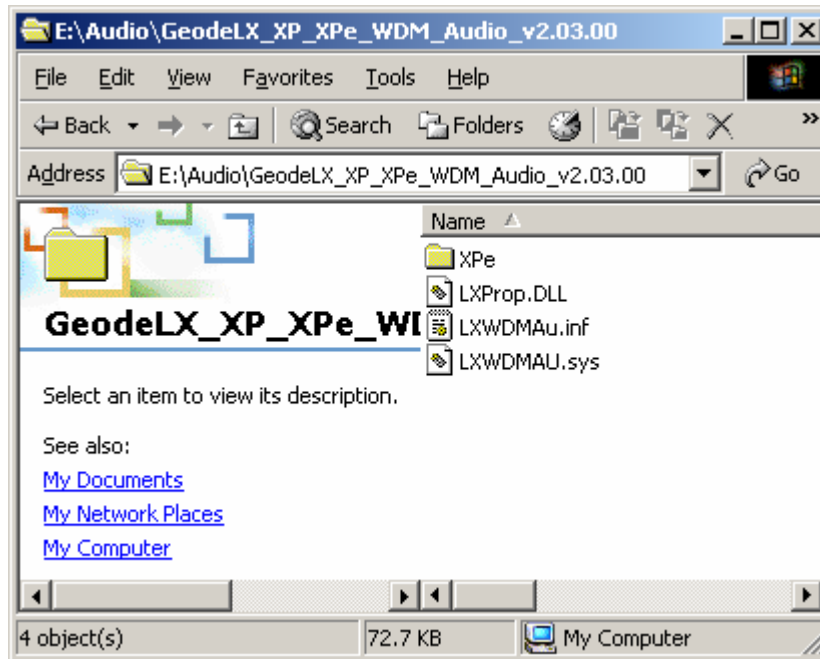
Click **NEXT** to continue.



**Figure 7-18: Locate Driver Files**



**Step 8:** Select “X:\Audio\GeodeLX\_XP\_XPe\_WDM\_Audio\_v2.03.00” directory in the location browsing window, where “X:\” is the system CD drive (**Figure 7-19**).



**Figure 7-19: Location Browsing Window**

**Step 9:** Click **OK** to continue. A driver files location menu window appears. Select the **LXWDMAu.inf** file and click **OPEN** to continue. The driver is installed.

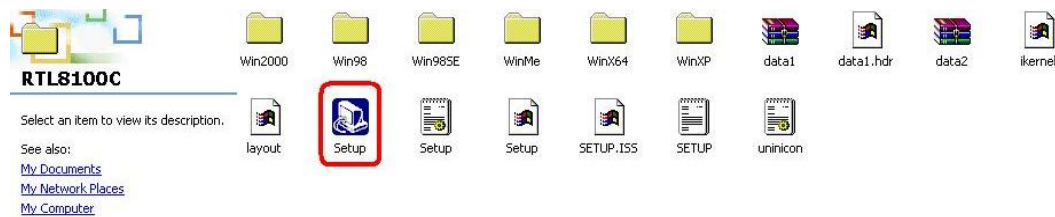
## 7.5 LAN Driver

To install the LAN driver, please follow the steps below.

**Step 1:** Click **LAN** from the **AMD LX/GX CD Driver Menu** to open a window to the **X:\LAN\Realtek** (where **X:\** is the system CD drive) folder on the driver CD.

**Step 2:** Open the **RTL8100C** folder.

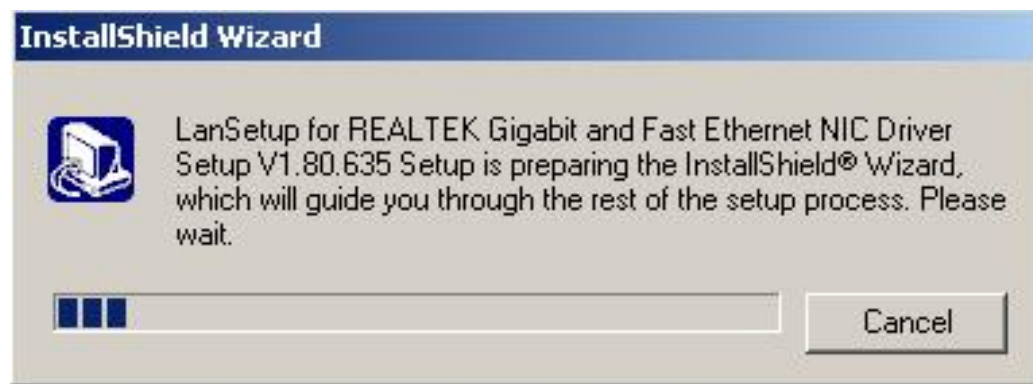
**Step 3:** Locate the **Setup** program icon (**Figure 7-20**).



**Figure 7-20: Locate the Setup Program Icon**

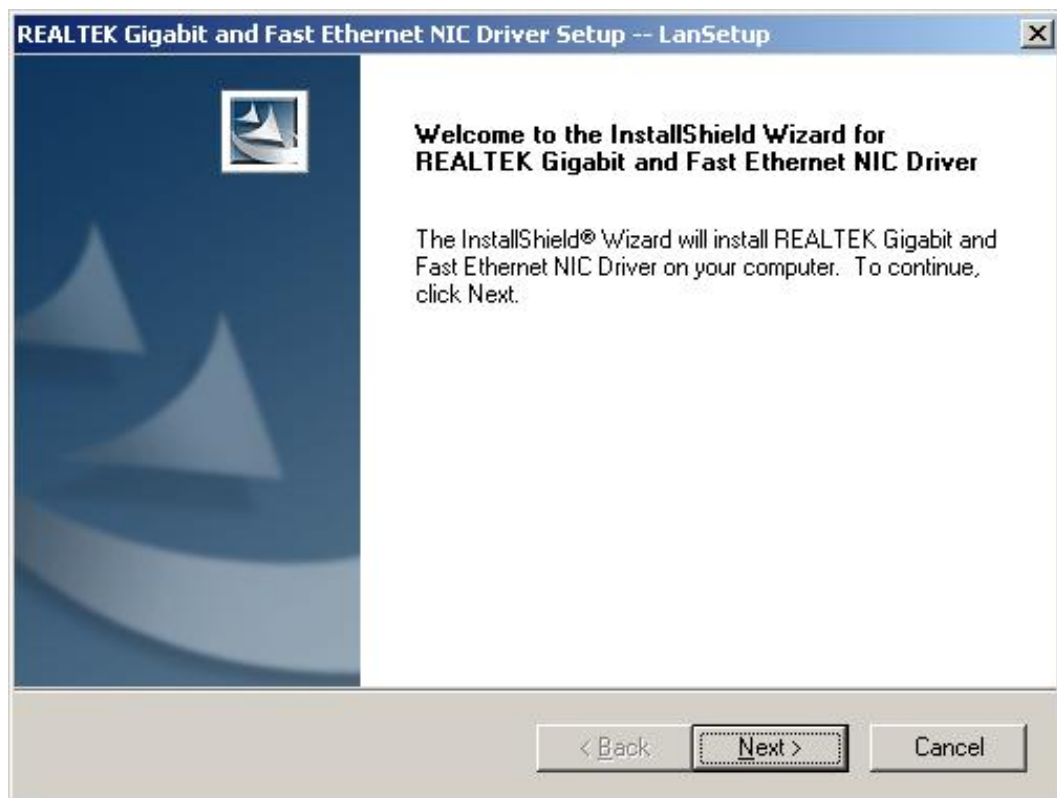
**Step 4:** Double click the **Setup** program icon in **Figure 7-20**.

**Step 5:** The **Install Shield Wizard** is prepared to guide the user through the rest of the process (**Figure 7-21**).



**Figure 7-21: Preparing Setup Screen**

**Step 6:** Once initialized, the **Install Wizard** welcome screen appears (**Figure 7-22**).

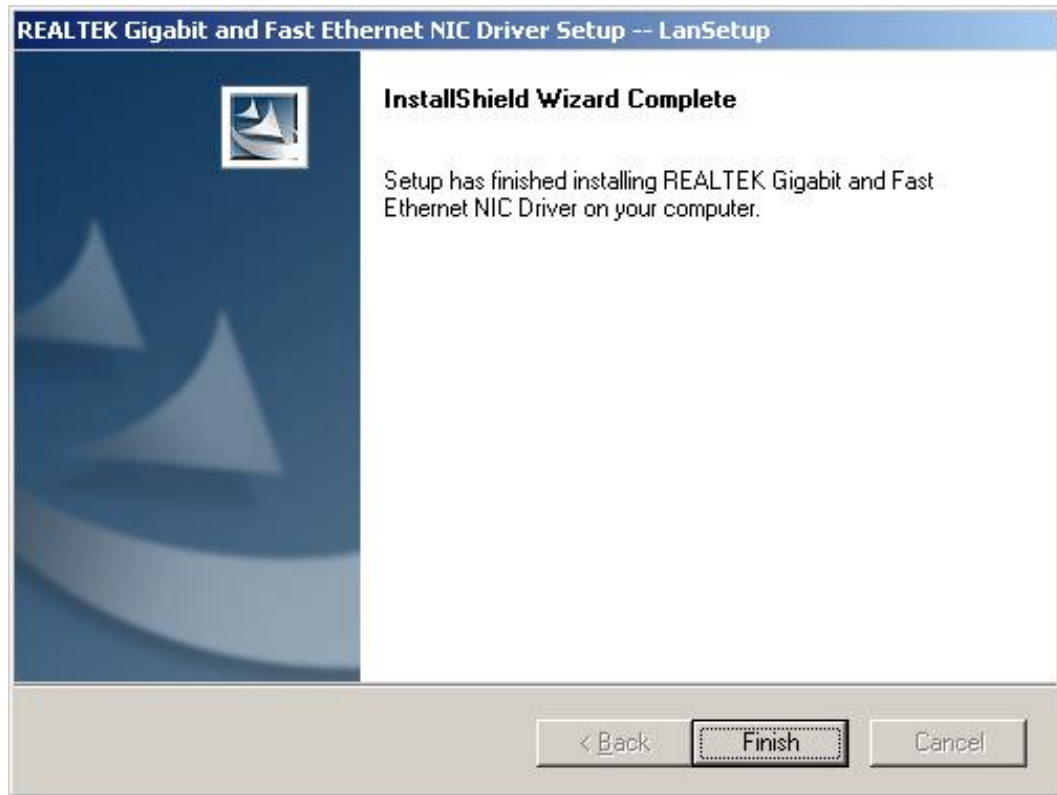


**Figure 7-22: Install Wizard Welcome Screen**

**Step 7:** Click **NEXT** to continue the installation or **CANCEL** to stop the installation.

**Step 8:** The **Install Wizard** starts to install the LAN driver.

**Step 9:** Once the installation is complete, the **InstallShield Wizard Complete** screen appears (**Figure 7-23**).



**Figure 7-23: Installing Screen**

**Step 10:** Click **FINISH** to complete the installation and exit the **Install Shield Wizard**.

**Step 11:** Once the installation process is complete, the computer may be restarted immediately or later. Select the preferred option and click **FINISH** to complete the installation process and exit the **Install Shield Wizard** (Figure 7-24).



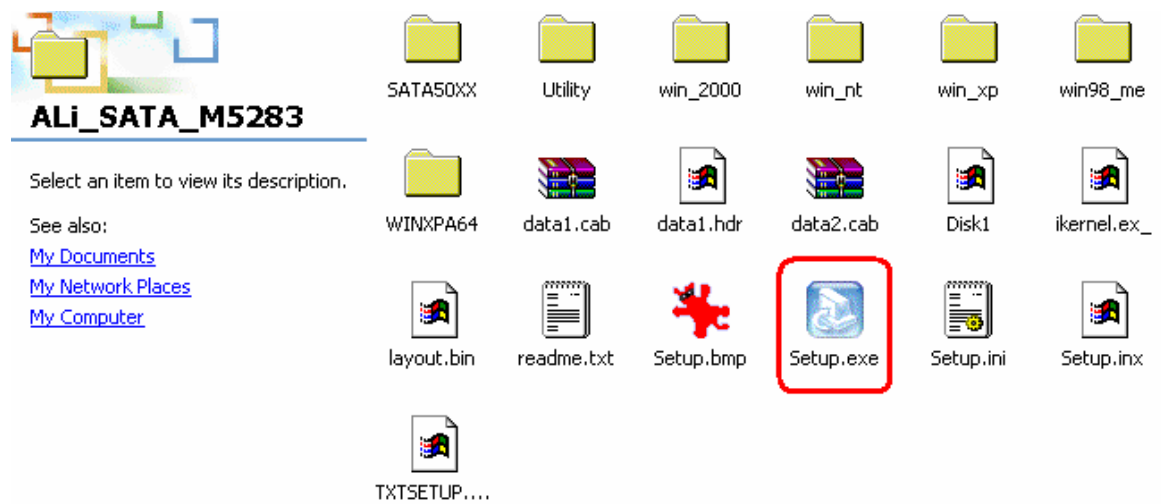
**Figure 7-24: Restart the Computer**

## 7.6 SATA/RAID Driver

To install the ALi SATA/RAID driver, follow the steps below.

**Step 1:** Click **SATA** from the **AMD LX/GX CD Driver Menu** to open a window to the **X:\ALi\_SATA\_M5283** (where X:\ is the system CD drive) folder on the driver CD.

**Step 2:** Locate the **Setup** program icon (Figure 7-25).



**Figure 7-25: Locate the Setup Program Icon**

**Step 3:** The **Install Shield Wizard** (Figure 7-26) is prepared to guide the user through the rest of the process.

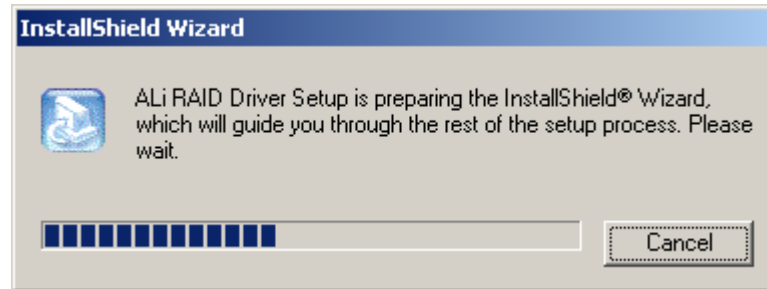


Figure 7-26: Preparing Setup Screen

**Step 4:** Once initialized, the **Install Wizard** welcome screen appears (Figure 7-27).

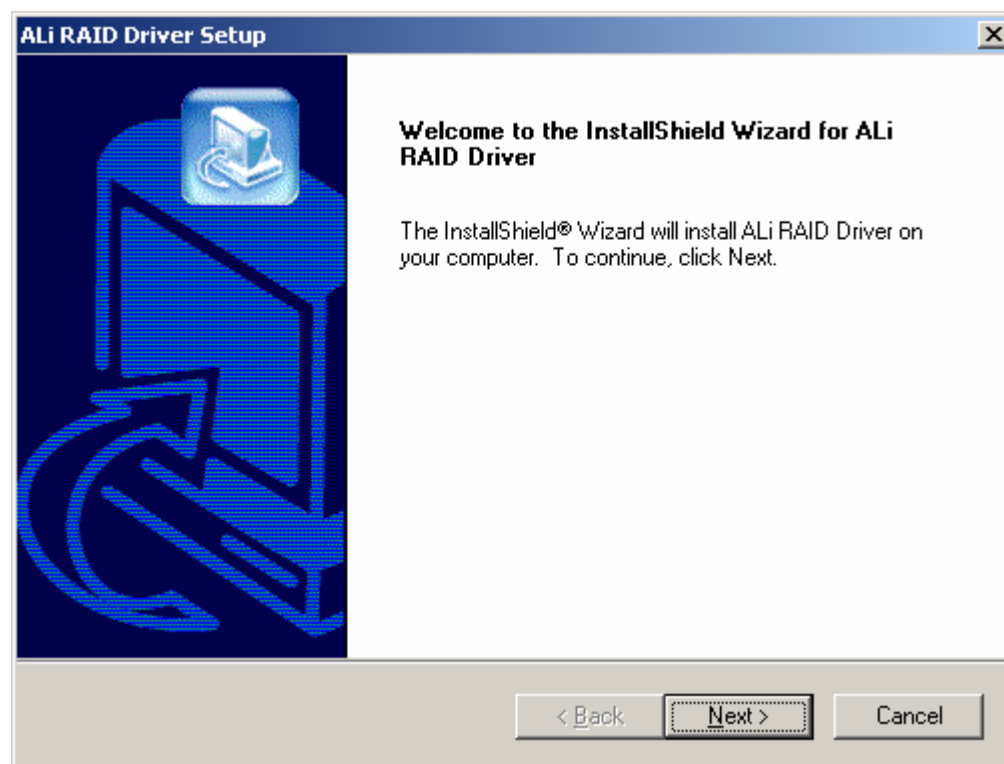
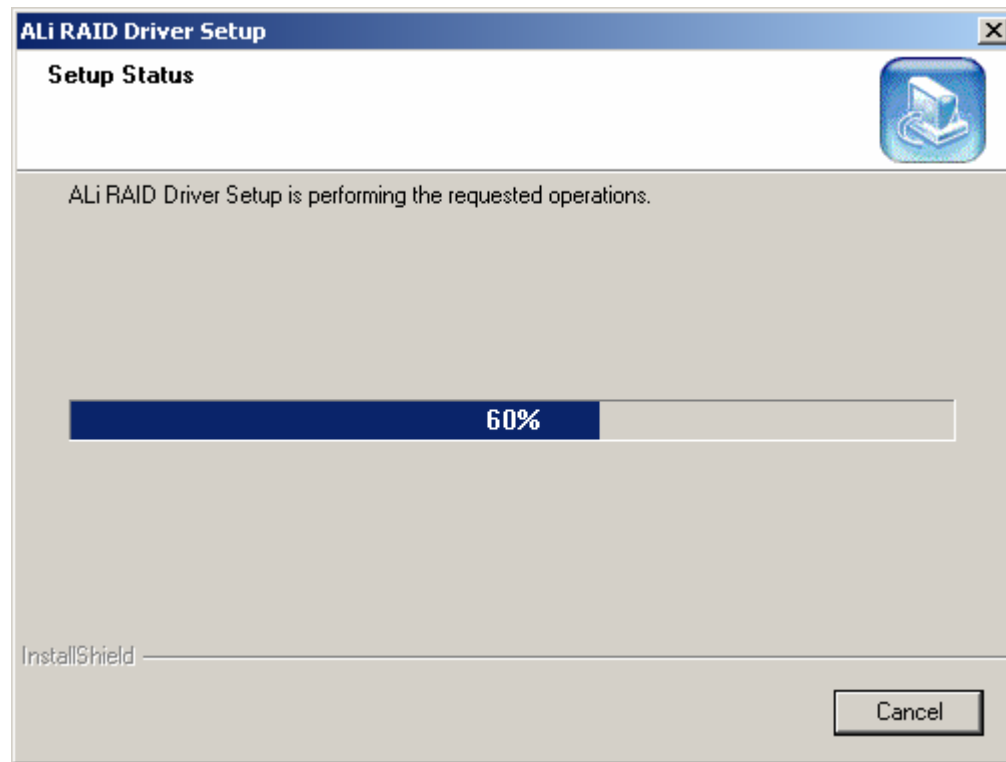


Figure 7-27: Install Wizard Welcome Screen

**Step 5:** Click **NEXT** to continue the installation or **CANCEL** to stop the installation.

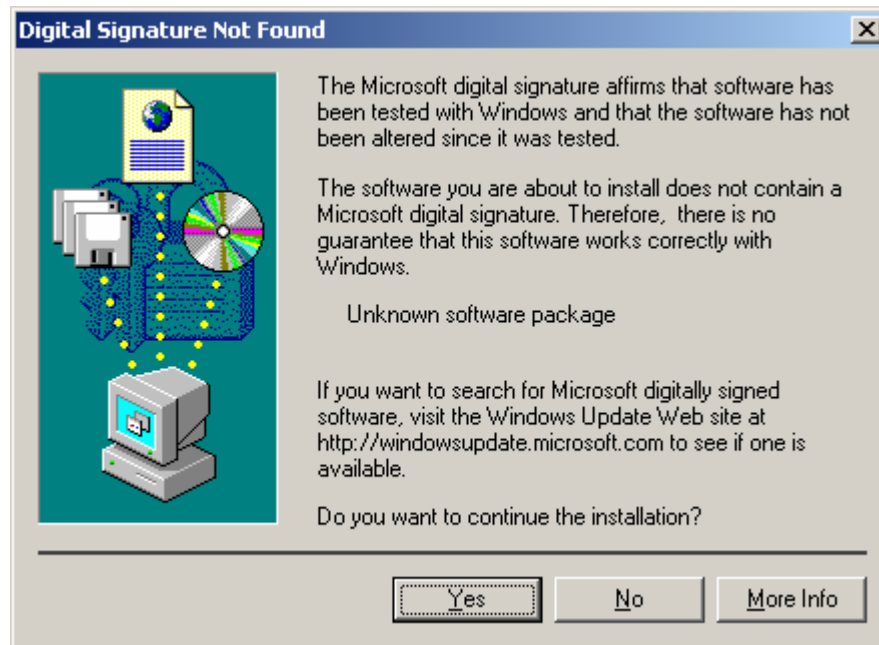
**Step 6:** The **Install Wizard** starts to install the driver (**Figure 7-28**).



**Figure 7-28: Installing Screen**

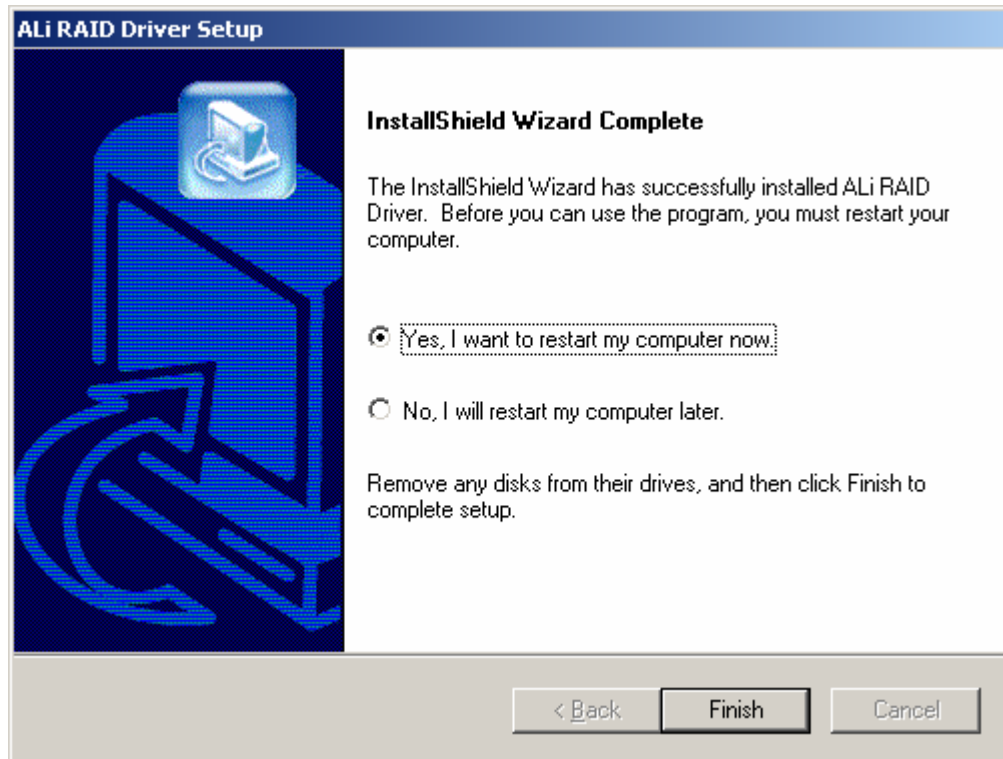


**Step 7:** A “Digital Signal Not Found” screen appears (Figure 7-29). Click **Yes** to continue the installation process.



**Figure 7-29: RAID Driver Digital Signal**

**Step 8:** Once the installation is complete, the **InstallShield Wizard Complete** screen appears (**Figure 7-30**).



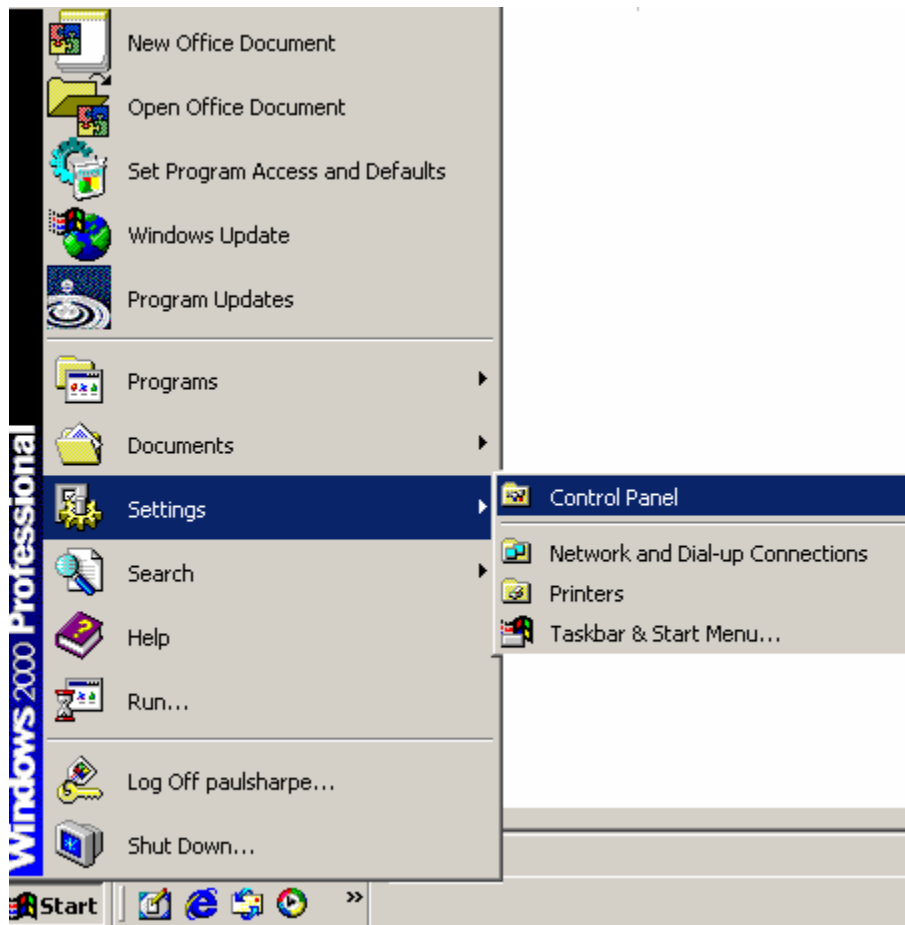
**Figure 7-30: InstallShield Wizard Complete Screen**

**Step 9:** Once the installation process is complete, the computer may be restarted immediately or later. Select the preferred option and click **FINISH** to complete the installation process and exit the **Install Shield Wizard**.

## 7.7 ISA Driver

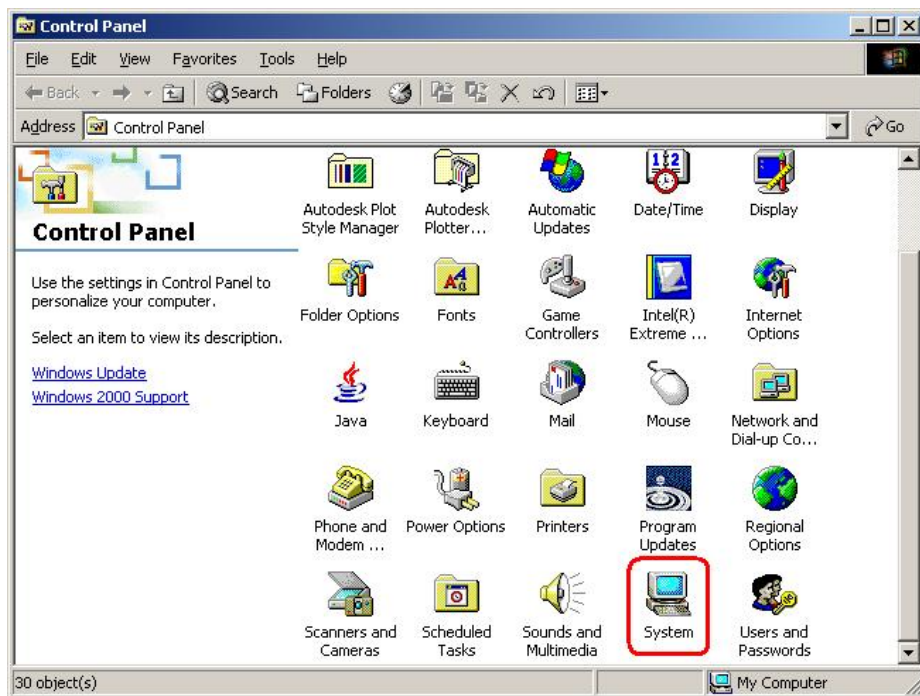
To install the **IT8888 ISA Bridge** driver please follow the steps below:

**Step 1:** Open **Windows Control Panel** (Figure 7-31).



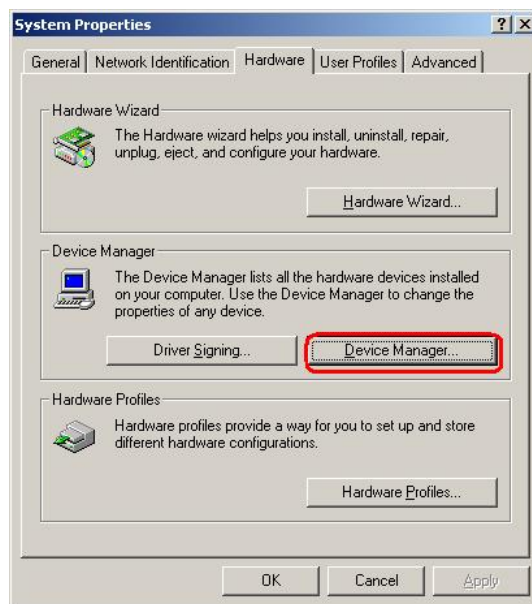
**Figure 7-31: Access Windows Control Panel**

**Step 2:** Double click the **System** icon (Figure 7-32).



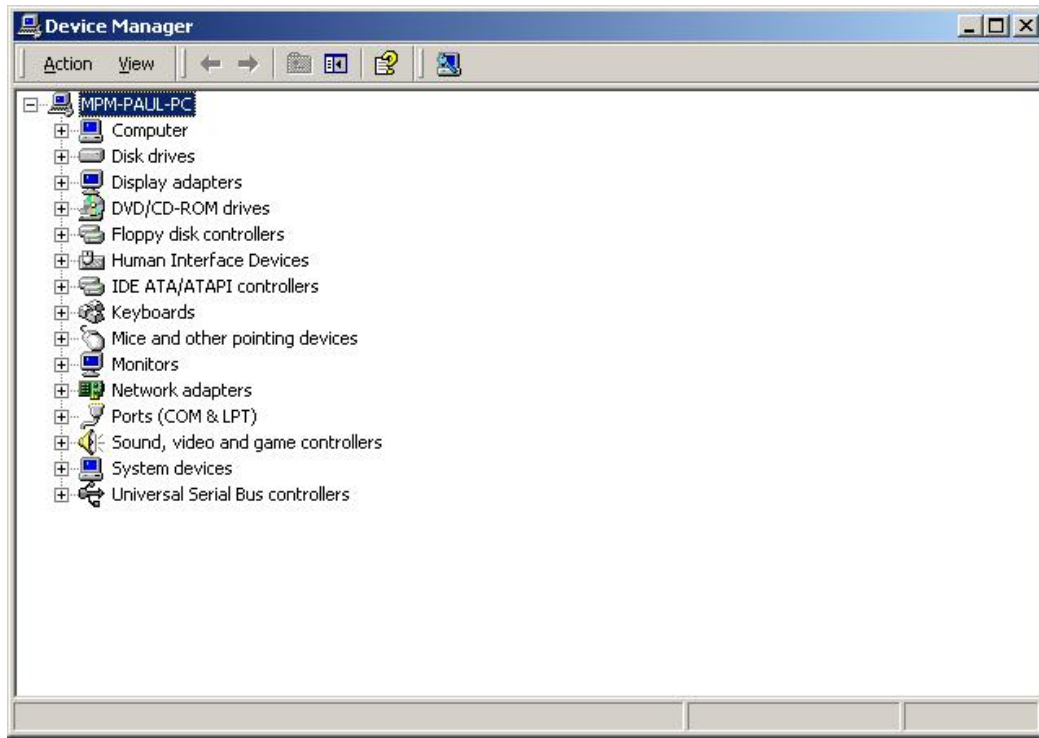
**Figure 7-32: Double Click the System Icon**

**Step 3:** Double click the **Device Manager** tab (Figure 7-33).



**Figure 7-33: Double Click the Device Manager Tab**

**Step 4:** A list of system hardware devices appears (**Figure 7-34**).



**Figure 7-34: Device Manager List**

**Step 5:** Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

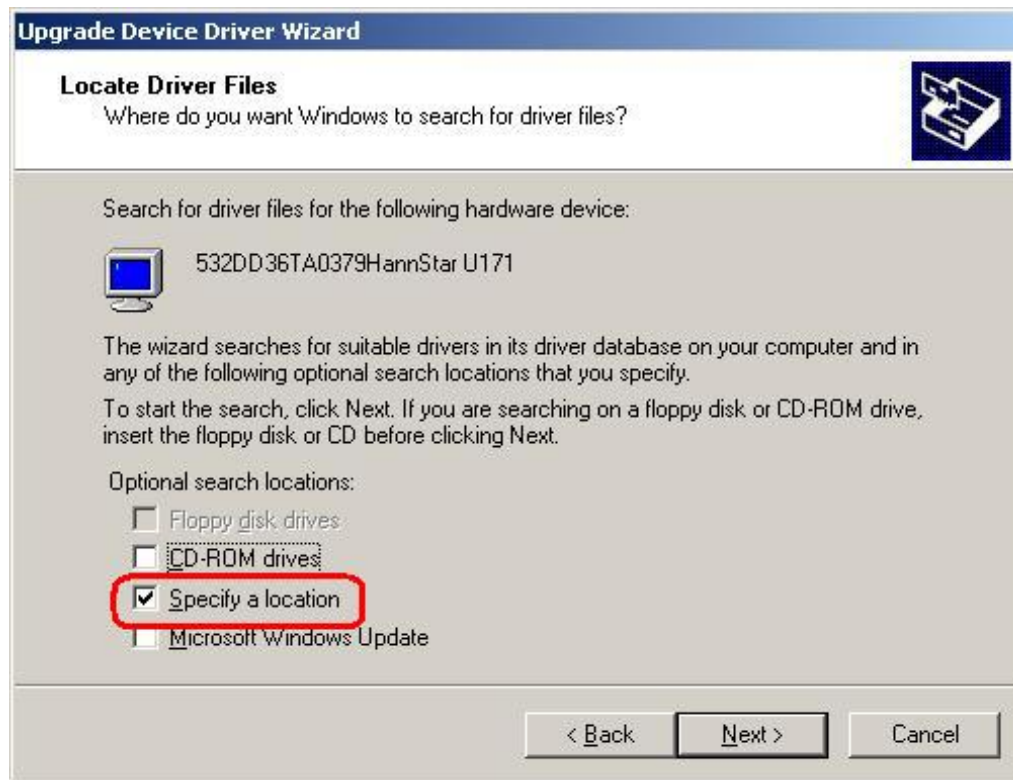
**Step 6:** The **Device Driver Wizard** appears (**Figure 7-35**). Click **NEXT** to continue.



**Figure 7-35: Search for Suitable Driver**

**Step 7:** Select “Specify a Location” in the **Locate Driver Files** window (Figure 7-36).

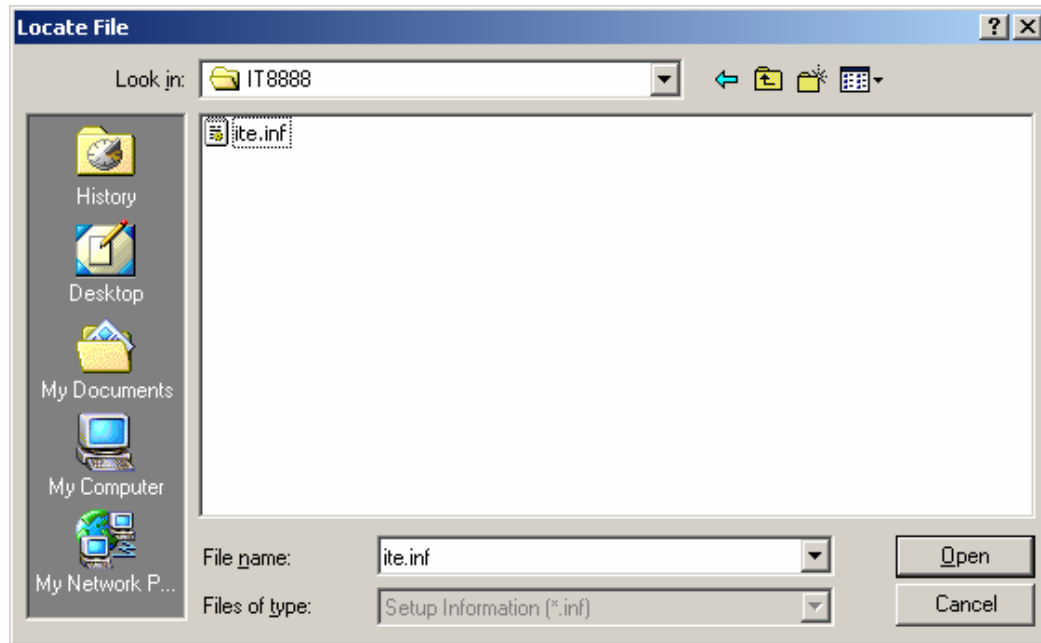
Click **NEXT** to continue.



**Figure 7-36: Locate Driver Files**



**Step 8:** Select “X:\IT8888” directory in the location browsing window, where “X:\” is the system CD drive (**Figure 7-37**).



**Figure 7-37: Location Browsing Window**

Click **OK** to continue. A driver files location menu window appears. Select the **ite.inf** file and click **OPEN** to continue. The driver is installed.

*Intentionally Blank*

Appendix

A

# BIOS Menu Options

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## A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 6**.

|   |     |
|---|-----|
| ➔ Load Fail-Safe Defaults .....             | 105 |
| ➔ Load Optimized Defaults.....              | 105 |
| ➔ Set Supervisor Password .....             | 105 |
| ➔ Set User Password .....                   | 105 |
| ➔ Save & Exit Setup .....                   | 105 |
| ➔ Exit Without Saving .....                 | 105 |
| ➔ Date [Day mm:dd:yyyy].....                | 106 |
| ➔ Time [hh/mm/ss] .....                     | 106 |
| ➔ IDE Master and IDE Slave .....            | 106 |
| ➔ Drive A [1.44M, 3.5in].....               | 107 |
| ➔ Drive B [None].....                       | 107 |
| ➔ Halt On [All, But Keyboard] .....         | 107 |
| ➔ Base Memory: .....                        | 108 |
| ➔ Extended Memory.....                      | 108 |
| ➔ Total Memory.....                         | 108 |
| ➔ IDE HDD Auto-Detection [Press Enter]..... | 109 |
| ➔ IDE Primary Master [Auto] .....           | 109 |
| ➔ Access Mode [Auto] .....                  | 110 |
| ➔ Capacity .....                            | 110 |
| ➔ Cylinder.....                             | 111 |
| ➔ Head .....                                | 111 |
| ➔ Precomp.....                              | 111 |
| ➔ Landing Zone .....                        | 111 |
| ➔ Sector .....                              | 111 |
| ➔ Virus Warning [Disabled] .....            | 112 |
| ➔ CPU Internal Cache [Enabled].....         | 113 |
| ➔ Boot From LAN Control [Disabled].....     | 113 |
| ➔ SATA Boot ROM Control [Disabled] .....    | 114 |

|  |     |
|--|-----|
| ➔ Boot Device .....                            | 114 |
| ➔ Boot Other Device [Enabled] .....            | 115 |
| ➔ Swap Floppy Drive [Disabled] .....           | 115 |
| ➔ Boot Up Floppy Seek [Disabled] .....         | 115 |
| ➔ Boot Up Numlock Status [On] .....            | 116 |
| ➔ Gate A20 Option [Fast] .....                 | 116 |
| ➔ Typematic Rate Setting [Disabled] .....      | 116 |
| ➔ Typematic Rate (Chars/sec) [6] .....         | 116 |
| ➔ Typematic Delay (Msec) [250] .....           | 117 |
| ➔ Security Option [Setup] .....                | 117 |
| ➔ OS Select For DRAM > 64MB [Non-OS2] .....    | 118 |
| ➔ Small Logo (EPA) Show [Disabled] .....       | 118 |
| ➔ CPU Frequency [500 MHz] .....                | 119 |
| ➔ Memory Frequency [Auto] .....                | 120 |
| ➔ CAS Latency [Auto] .....                     | 120 |
| ➔ Interleave Select [LOI] .....                | 120 |
| ➔ Video Memory Size [8 M] .....                | 120 |
| ➔ Output Display [Panel & CRT] .....           | 121 |
| ➔ Flat Panel Configuration [Press Enter] ..... | 121 |
| ➔ OnBoard Audio [Enabled] .....                | 121 |
| ➔ Onboard USB1.1 [Enabled] .....               | 121 |
| ➔ Onboard USB2.0 [Enabled] .....               | 121 |
| ➔ Flat Panel Type [Auto] .....                 | 122 |
| ➔ Resolution [800 x 600] .....                 | 123 |
| ➔ Data Bus Type [9 – 24 bits, 1 ppc] .....     | 123 |
| ➔ Refresh Rate [60 Hz] .....                   | 123 |
| ➔ HSYNC Polarity [Low] .....                   | 124 |
| ➔ VSYNC Polarity Active [Low] .....            | 124 |
| ➔ SHFCLK Active Period [Free Running] .....    | 124 |
| ➔ LP Active Period [Free Running] .....        | 124 |
| ➔ On-Chip IDE Channel 1 [Enabled] .....        | 125 |
| ➔ Drive PIO Mode [Auto] .....                  | 125 |

|  |     |
|--|-----|
| ➔ IDE UDMA [Auto].....                         | 126 |
| ➔ IDE DMA transfer access [Enabled].....       | 126 |
| ➔ IT8888 ISA Decode IO [Press Enter] .....     | 127 |
| ➔ IT8888 ISA Decode Memory [Press Enter] ..... | 127 |
| ➔ IDE HDD Block Mode [Enabled] .....           | 127 |
| ➔ Onboard FDC Controller [Enabled].....        | 127 |
| ➔ Onboard Serial Port 1 [3F8/IRQ4].....        | 127 |
| ➔ Onboard Serial Port 2 [2F8/IRQ3].....        | 128 |
| ➔ Onboard Serial Port 3 [Disabled] .....       | 128 |
| ➔ Onboard Parallel Port [378/IRQ7].....        | 128 |
| ➔ Parallel Port Mode [SPP].....                | 129 |
| ➔ x EPP Mode Select [EPP1.7] .....             | 129 |
| ➔ x ECP Mode Use DMA [3].....                  | 130 |
| ➔ Decode IO Space N [Enabled] .....            | 132 |
| ➔ Decode IO Speed N [Fast Speed] .....         | 132 |
| ➔ Decode IO Address N 0:15 [xx] .....          | 132 |
| ➔ Decode IO Size N [Fast Speed].....           | 133 |
| ➔ Decode Memory Space N [Enabled] .....        | 134 |
| ➔ Decode Memory Speed N [Fast Speed].....      | 134 |
| ➔ Decode Memory Address N [xx].....            | 134 |
| ➔ Decode Memory Size N [xx].....               | 135 |
| ➔ x ACPI Function [Disabled].....              | 136 |
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| ➔ Power Management [APM].....                  | 136 |
| ➔ x Standby Mode [Disabled].....               | 136 |
| ➔ x Suspend Mode [Disabled].....               | 137 |
| ➔ Soft-Off by PWR-BTTN [Instant-Off] .....     | 138 |
| ➔ Power-On by Alarm [Disabled].....            | 138 |
| ➔ PNP OS Installed [No] .....                  | 139 |
| ➔ Reset Configuration Data [Disabled] .....    | 140 |
| ➔ Resources Controlled By [Auto (ESCD)].....   | 140 |
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➔ PCI/VGA Palette Snoop [Disabled]..... 143

➔ Fan Speed..... 144

➔ Voltages ..... 144

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Appendix

B

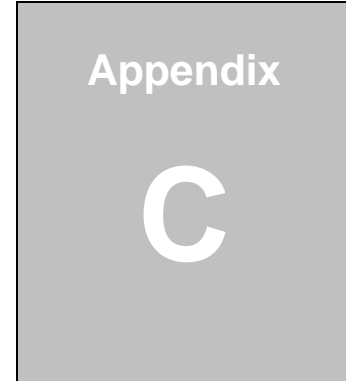
# Terminology

---

|               |  |
|---------------|--|
| AC '97        | Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.   |
| ACPI          | Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.   |
| AHCI          | Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.  |
| ATA           | The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.  |
| APM           | The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.   |
| BIOS          | The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user  |
| CODEC         | The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.  |
| CompactFlash® | CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types. |
| CMOS          | Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.  |
| COM           | COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.                             |
| DAC           | The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.  |
| DDR           | Double Data Rate refers to a data bus transferring data on both the  |

|                        |   |
|------------------------|---|
|                        | rising and falling edges of the clock signal.   |
| DMA                    | Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.  |
| DIMM                   | Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.   |
| GPIO                   | General purpose input   |
| HDD                    | Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.   |
| HyperTransport™<br>Bus | The HyperTransport™ bus, which uses HyperTransport™ technology, interfaces an AMD CPU with the Northbridge. HyperTransport™ technology provides a high-speed, low latency, point-to-point link between the CPU and the Northbridge. |
| L1 Cache               | The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.   |
| L2 Cache               | The Level 2 Cache (L2 Cache) is an external processor memory cache.   |
| LCD                    | Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.   |
| LVDS                   | Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.  |
| POST                   | The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.   |
| RAID                   | Redundant Array of Inexpensive Disks (RAID) refers to redundantly backing up data on multiple disks to ensure that if one disk fails, the data is not lost and can be restored from the remaining disks in the array.               |

|      |   |
|------|---|
| RAM  | Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.   |
| SATA | Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps. |
| UART | Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.  |
| UHCI | The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.  |
| USB  | The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates, while USB 2.0 supports 480Mbps data transfer rates.  |
| VGA  | The Video Graphics Array (VGA) is a graphics display system developed by IBM.   |



# DIO Interface

---

## C.1 DIO Interface Introduction

The DIO connector on the CZGA LX-50 is interfaced to GPIO ports on the Winbond W83627EHG Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.



### NOTE:

For further information, please refer to the datasheet for the IT8712F Super I/O chipset.

---

## C.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

| Pin | Description | Super I/O Pin | Super I/O Pin Description         |
|-----|-------------|---------------|-----------------------------------|
| 1   | Ground      | N/A           | N/A                               |
| 2   | VCC         | N/A           | N/A                               |
| 3   | Output 3    | GP27          | General purpose I/O port 2 bit 7. |
| 4   | Output 2    | GP26          | General purpose I/O port 2 bit 6. |
| 5   | Output 1    | GP25          | General purpose I/O port 2 bit 5. |
| 6   | Output 0    | GP24          | General purpose I/O port 2 bit 4. |
| 7   | Input 3     | GP23          | General purpose I/O port 2 bit 3. |
| 8   | Input 2     | GP22          | General purpose I/O port 2 bit 2. |
| 9   | Input 1     | GP21          | General purpose I/O port 2 bit 1. |
| 10  | Input 0     | GP20          | General purpose I/O port 2 bit 0. |

## C.3 Assembly Language Samples

### C.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

|            |                  |                                 |
|------------|------------------|---------------------------------|
| <b>MOV</b> | <b>AX, 6F08H</b> | Sets the digital port as input  |
| <b>INT</b> | <b>15H</b>       | Initiates the INT 15H BIOS call |

### C.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

|            |                  |                                 |
|------------|------------------|---------------------------------|
| <b>MOV</b> | <b>AX, 6F09H</b> | Sets the digital port as output |
| <b>MOV</b> | <b>BL, 09H</b>   |                                 |
| <b>INT</b> | <b>15H</b>       | Initiates the INT 15H BIOS call |

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Appendix

D

# Watchdog Timer

---

**NOTE:**

The following discussion applies to DOS environment.

Contact CyberResearch support or visit the CyberResearch website for specific drivers for more sophisticated operating systems, e.g., Windows®

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

**INT 15H:**

| <b>AH – 6FH Sub-function:</b> |   |
|-------------------------------|---|
| AL – 2:                       | Sets the Watchdog Timer's period.   |
| BL:                           | Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup). |

**Table D-1: AH-6FH Sub-function**

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

**NOTE:**

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

---

**Example program:**

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

    MOV     AX, 6F02H      ;setting the time-out value
    MOV     BL, 30         ;time-out value is 48 seconds
    INT     15H

;
; ADD THE APPLICATION PROGRAM HERE
;

    CMP     EXIT_AP, 1     ;is the application over?
    JNE     W_LOOP        ;No, restart the application

    MOV     AX, 6F02H      ;disable Watchdog Timer
    MOV     BL, 0          ;
    INT     15H

;
; EXIT ;
```

*Intentionally Blank*

Appendix

E

# Address Mapping

---

## E.1 IO Address Map

| I/O address Range | Description                     |
|-------------------|---------------------------------|
| 000-01F           | DMA Controller                  |
| 020-021           | Interrupt Controller            |
| 040-043           | System time                     |
| 060-06F           | Keyboard Controller             |
| 070-07F           | System CMOS/Real time Clock     |
| 080-09F           | DMA Controller                  |
| 0A0-0A1           | Interrupt Controller            |
| 0C0-0DF           | DMA Controller                  |
| 0F0-0FF           | Numeric data processor          |
| 1F0-1F7           | Primary IDE Channel             |
| 2F8-2FF           | Serial Port 2 (COM2)            |
| 378-37F           | Parallel Printer Port 1 (LPT1)  |
| 3B0-3BB           | CS5536 Graphics Controller      |
| 3C0-3DF           | CS5536 Graphics Controller      |
| 3F6-3F6           | Primary IDE Channel             |
| 3F7-3F7           | Standard floppy disk controller |
| 3F8-3FF           | Serial Port 1 (COM1)            |

Table E-1: IO Address Map

## E.2 1st MB Memory Address Map

| Memory address | Description   |
|----------------|---------------|
| 00000-9FFFF    | System memory |
| A0000-BFFFF    | VGA buffer    |
| F0000-FFFFF    | System BIOS   |
| 1000000-       | Extend BIOS   |

Table E-2: 1<sup>st</sup> MB Memory Address Map

### E.3 IRQ Mapping Table

| IRQ0 | System Timer     | IRQ8  | RTC clock       |
|------|------------------|-------|-----------------|
| IRQ1 | Keyboard         | IRQ9  | ACPI            |
| IRQ2 | Available        | IRQ10 | LAN             |
| IRQ3 | COM2             | IRQ11 | LAN/USB2.0/SATA |
| IRQ4 | COM1             | IRQ12 | PS/2 mouse      |
| IRQ5 | SMBus Controller | IRQ13 | FPU             |
| IRQ6 | FDC              | IRQ14 | Primary IDE     |
| IRQ7 | Available        | IRQ15 | Secondary IDE   |

Table E-3: IRQ Mapping Table

### E.4 DMA Channel Assignments

| Channel | Function                     |
|---------|------------------------------|
| 0       | Available                    |
| 1       | Available                    |
| 2       | Floppy disk (8-bit transfer) |
| 3       | Available                    |
| 4       | Cascade for DMA controller 1 |
| 5       | Available                    |
| 6       | Available                    |
| 7       | Available                    |

Table E-4: IRQ Mapping Table

*Intentionally Blank*





Appendix

F

# ALi® RAID

---

## F.1 Introduction

The ALi M5283 SATA RAID chipset can control parallel ATA (PATA) and serial ATA (SATA) disks. The ALi controller supports PATA UDMA transfer mode up to mode 6 and SATA 1 disk drives. The ALi M5283 also has a cost-effective RAID functionality that can increase the data read/write speed and provide protection to data by distributing mirrored duplicates of data onto two disk drives (RAID 1).



### CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

---

#### F.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID 1 array, a failed drive can be replaced and the RAID configuration restored.



### WARNING!

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

---

**CAUTION!**

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

---

## F.2 Features and Benefits

- Supports RAID levels 0, 1, and JBOD
- Supports connectivity to two disk drives
- Supported Operating Systems include: Windows 98/Me, Windows 2000 and Windows XP
- Windows-based software for RAID management

## F.3 Accessing the ALi RAID Utility

To access the **Ali RAID Utility**, please follow the steps below:

**Step 1: Connect SATA drives to the system.** Connect two SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

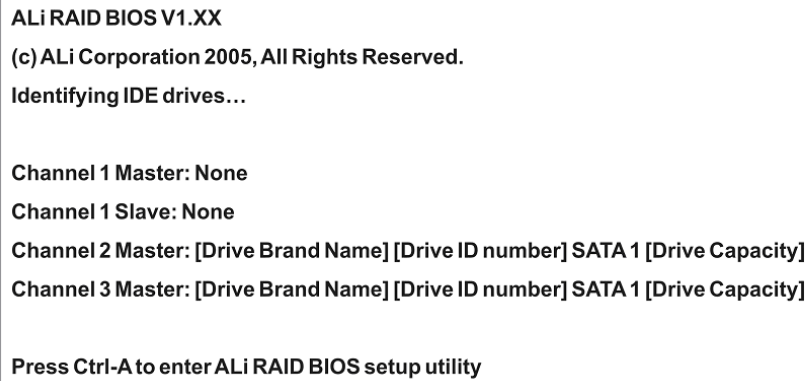
**NOTE:**

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration (JBOD, RAID 0 or RAID 1). If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

---

**Step 2: Enable SATA drives in BIOS.** Start the computer and access the **AMI BIOS** setup program. Next, open the **Advanced CMOS Setup** menu. Enable the **SATA ROM Support BIOS** option.

- Step 3: Save and Exit BIOS.** After the **SATA ROM Support BIOS** option is enabled, save and exit the **BIOS**.
- Step 4: Reboot the system.** Reboot the system after saving and exiting the **BIOS**.
- Step 5: Press Ctrl-A.** When the following screen appears, press **Ctrl-A** to enter the **ALi RAID BIOS** setup program.



```
ALI RAID BIOS V1.XX
(c) ALi Corporation 2005, All Rights Reserved.
Identifying IDE drives...

Channel 1 Master: None
Channel 1 Slave: None
Channel 2 Master: [Drive Brand Name] [Drive ID number] SATA 1 [Drive Capacity]
Channel 3 Master: [Drive Brand Name] [Drive ID number] SATA 1 [Drive Capacity]

Press Ctrl-A to enter ALi RAID BIOS setup utility
```

**Figure F-1: Accessing ALi RAID BIOS Utility**

**Step 6:** Delete RAID settings and partitions. The RAID BIOS Setup Utility in the following screen appears. Before configuring the array, select the “**Delete All RAID Setting & Partition**”.

RAID BIOS Setup Utility
© 2006 ALi Corporation
www.ali.com.tw

Create RAID 0 Striping for Performance  
Create RAID 1 Mirroring for Reliability  
Create JBOD for integrate Capacity  
Stripe Size 16K  
Delete RAID Settings and Partition  
Delete All RAID Settings and Partition  
Rebuild RAID Array

SPACE : Select  
↑↓ : Moving Cursor  
Enter : Finish  
ESC : Exit

Drive Model
Mode
Capacity
RAID Array/Type

Channel 1 Master: None  
Channel 1 Slave: None  
Channel 2 Master: [Drive Brand Name] [Drive ID number] SATA 1 [Drive Capacity]  
Channel 3 Master: [Drive Brand Name] [Drive ID number] SATA 1 Drive Capacity

Capacity
RAID Type
Stripe Size
RAID Name

RAID Array A:  
RAID Array B:  
RAID Array C:

### Figure F-2: RAID BIOS Setup Utility

**Step 7:** **Configure the RAID settings.** Use the **RAID BIOS Setup Utility** in **Chapter 6** to configure the RAID array. Brief descriptions are given below.

**Step 8: Install the OS.** After the RAID array has been configured (see below) install the OS. To do this, please refer to the documentation that came with the OS.

## F.4 RAID Options

### F.4.1 Create RAID 0 Striping for Performance



#### WARNING!

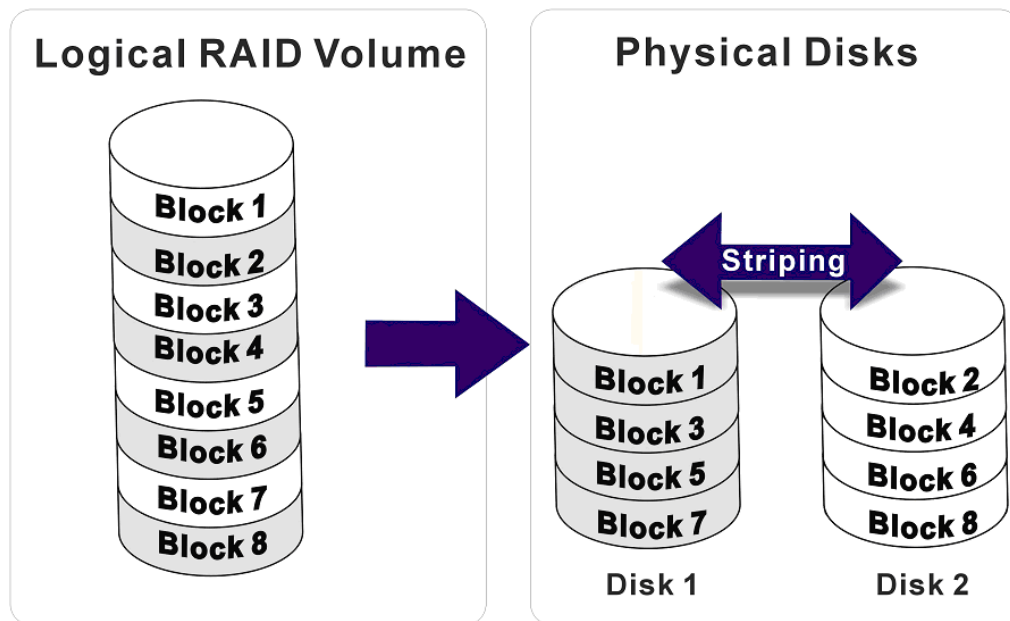
All data previously stored on the member drives of a RAID configuration are **destroyed** during the RAID initialization process. If “used” drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

---

- Step 1:** Select “**Create RAID 0 Striping for Performance**”. Use the arrow keys to highlight **Create RAID 0 Striping for Performance** and press **ENTER**. A flashing ‘S’ appears on the **Drive Menu** where the member drives to be included in the RAID 0 array can be chosen.
- Step 2:** Select **RAID array drive members**. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case ‘s’ once any of the connected disk drives has been selected. Follow the same method to select another member drive.
- Step 3:** **Confirm**. The **Create RAID 0(Y/N)** confirm box appears. Press **Y**.
- Step 4:** **Name the array**. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

**NOTE:**

1. To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. PATA drives connected on the same IDE channel cannot be selected as the members of a RAID 0 array. Avoid mixing PATA and SATA disk drives in a RAID 0 array.
2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array.





## F.4.2 Create RAID 1 Mirroring for Reliability



### WARNING!

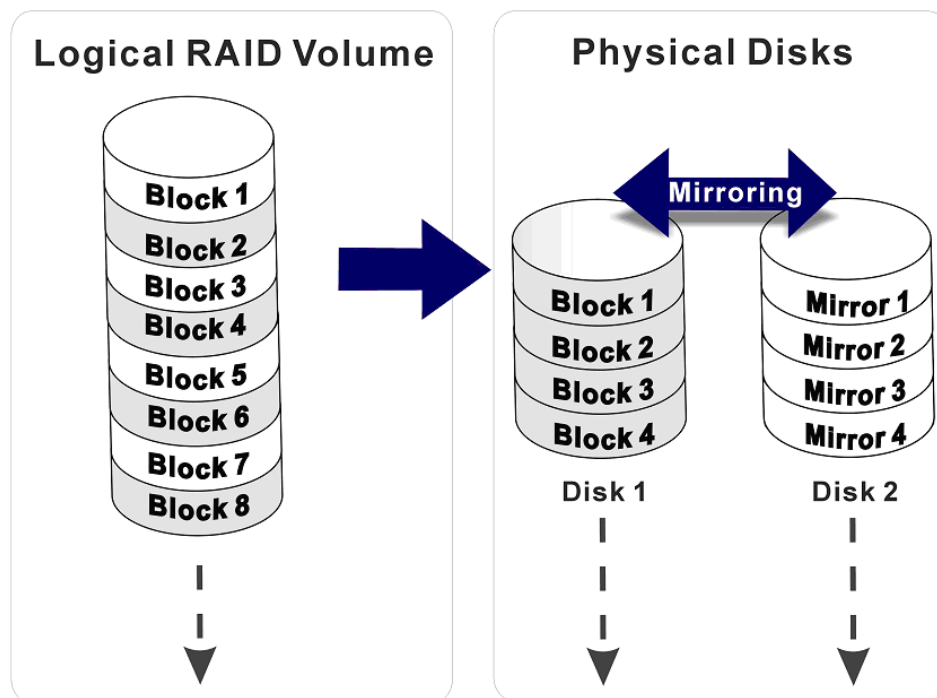
All data previously stored on the member drives of a RAID configuration is **destroyed** during the RAID initialization process. If “used” drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

---

- Step 1:** Select “Create RAID 1 Striping for Reliability”. Use the arrow keys to highlight **Create RAID 1 Striping for Reliability** and press **ENTER**. A flashing ‘S’ appears on the **Drive Menu** where the member drives to be included in the RAID 0 array can be chosen.
- Step 2:** Select RAID array drive members. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case ‘s’ once any of the connected disk drives has been selected. Follow the same method to select another member drive.
- Step 3:** Confirm. The **Create RAID 0(Y/N)** confirm box appears. Press **Y**.
- Step 4:** Name the array. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array
- Step 5:** View the array. A prompt appears to proceed with drive copy. The **Source** and **Destination** drives are indicated as “M” and “m” in the **Drive Menu**.

**NOTE:**

1. To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. PATA drives connected on the same IDE channel cannot be selected as the members of a RAID 1 array. Avoid mixing PATA and SATA disk drives in a RAID 1 array.
2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array.



### F.4.3 Create JBOD for Integrated Capacity

JBOD is defined as “Just a Bunch of Drives.” JBOD provides neither performance gains nor data redundancy.



#### **WARNING!**

All data previously stored on the member drives of a RAID configuration is **destroyed** during the RAID initialization process. If “used” drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

---

**Step 1:** Select “**Create JBOD for Integrated Capacity**”. Use the arrow keys to highlight **Create JBOD for Integrated Capacity** and press **ENTER**. A flashing ‘J’ appears on the **Drive Menu** where the member drives to be included in the JBOD array can be chosen.

**Step 2:** **Select RAID array drive members.** Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case ‘s’ once any of the connected disk drives has been selected. Follow the same method to select another member drive.

**Step 3:** **Confirm.** The **Create RAID 0 (Y/N)** confirm box appears. Press **Y**.

**Step 4:** **Name the array.** Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array

**NOTE:**

To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID 1 array. Avoid mixing Parallel-ATA and Serial-ATA disk drives in a RAID 1 array.

---

#### F.4.4 Stripe Size

Changing the stripe size effects RAID 0 arrays. Configurable options are:

- 64K (default)
- 32K
- 16K
- 8K
- 4K

Select a small stripe size if the I/Os to the hard drives are small and occur randomly. Choose a larger stripe size if the I/Os are mostly large and come in sequential orders, e.g., A/V playback and editing applications. The default value should be appropriate for most applications.

#### F.4.5 Delete RAID Setting & Partition

**WARNING!**

If a RAID configuration is deleted, all data previously stored on the member drives of the RAID configuration will also be deleted.

---

**Step 1: Delete a RAID setting.** Use the arrow keys to highlight **Delete RAID Setting & Partition** and press **ENTER**. A flashing 'E' appears at the **Drive Menu** where the member drives to be removed can be chosen.

**Step 2: Confirm Delete.** The **Data on RAID drives will be erased (Y/N)** confirm box appears. Press **Y**.

#### F.4.6 Delete All RAID Settings & Partitions



#### **WARNING!**

If a RAID configuration is deleted, all data previously stored on the member drives of the RAID configuration will also be deleted.

---

**Step 1: Delete RAID Settings.** Use the arrow keys to highlight **Delete All RAID Setting & Partition** and press **ENTER**.

**Step 2: Confirm delete.** The **Data on RAID drives will be erased (Y/N)** confirm box appears. Press **Y**.

#### F.4.7 Rebuild RAID Array

The **Rebuild RAID Array** option can rebuild a RAID array if a member of a RAID configuration should fail. Neither RAID 0 nor JBOD provides data redundancy. The **Rebuild RAID Array** option only applies to RAID 1 arrays and is applicable when a member of a RAID 1 configuration has failed.

**Step 1: Select Rebuild Array.** Use the arrow keys to highlight **Rebuild RAID Array** and press **ENTER**. A flashing 'R' appears in the list of existing arrays. The source and destination drives will be displayed.

**Step 2: Confirm rebuild array.** Press **Y** to begin the rebuild process.

**NOTE:**

A status bar will indicate the rebuild progress. Rebuild consumes considerable system resources and the time required for rebuilding a RAID array may vary depending on the size of stored data, disk drive capacity, and drive performance.

---

#### F.4.8 Select Boot Drive

**Step 1:** **Select the Boot Drive.** Use the arrow keys to highlight **Select Boot Drive** and press **ENTER**. A flashing 'A' appears at the **Drive Menu** where the boot drive can be chosen.

**Step 2:** **Press ENTER.** Press **ENTER** or the space bar to finish the configuration.

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Appendix

H

# External AC'97 Audio CODEC

---



## G.1 Introduction

The motherboard comes with an onboard Realtek ALC203 CODEC. Realtek ALC203 is a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 compatible stereo audio CODEC with a variable sampling rate.

### G.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through two phone jacks on the rear panel of the motherboard.

The phone jacks include:

1. A LINE output
2. A MIC input line

### G.1.2 Driver Installation

The driver installation has been described in **Section 7.4**.

After rebooting, the sound effect configuration utility appears in the **Windows Control Panel (Figure G-1)**. If the peripheral speakers are properly connected, sound effects should be heard.

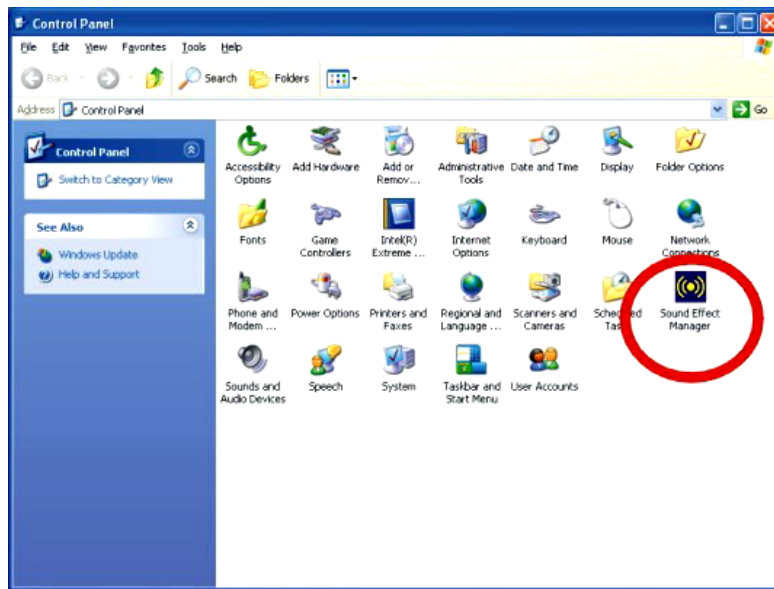


Figure G-1: Control Panel Sound Effect Manager

## G.2 Sound Effect Configuration

### G.2.1 Accessing the Sound Effects Manager

To access the Sound Effects Manager, please do the following:

**Step 1:** Install the audio CODEC driver.

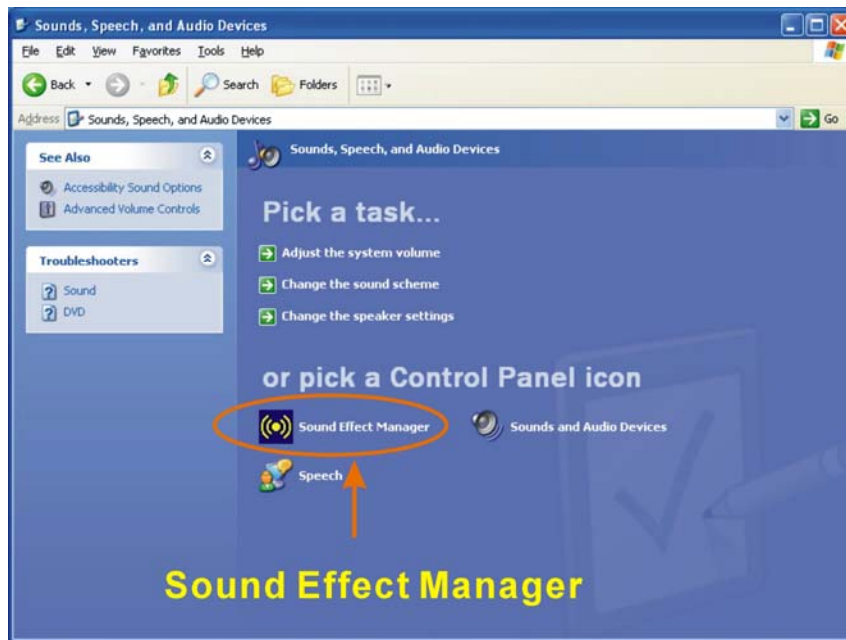
**Step 2:** Click either:

- The **Sound Effect Manager** icon in the **Notification Area** of the system task bar (**Figure G-2**), or



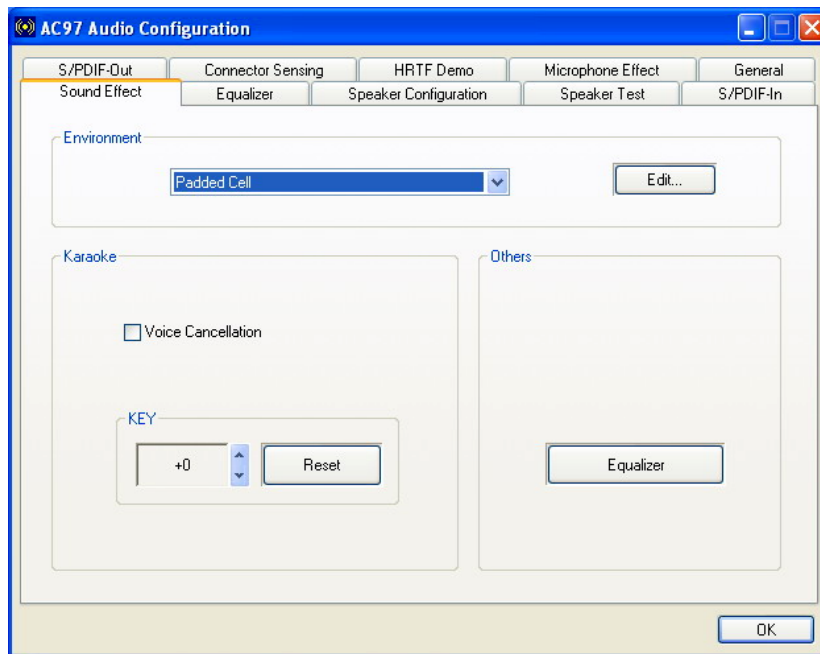
Figure G-2: Sound Effect Manager Icon [Task Bar]

**Step 3:** The Sound Effect Manager icon in the Control Panel (**Figure G-3**).



**Figure G-3: Sound Effect Manager Icon [Control Panel]**

**Step 4:** The sound effect manager appears (**Figure G-4**).



**Figure G-4: Sound Effects Manager (ALC203)**



**NOTE:**

The Sound Effect Manager shown in **Figure G-4** is for the Realtek ALC203 audio CODEC. Different CODECs may have different sound manager appearances.

The following section describes the different configuration options in the Sound Effect Manager.

### G.2.2 Sound Effect Manager Configuration Options

The **Sound Effects Manager** enables configuration of the items listed below. To configure these items click the corresponding menu tab in the **Sound Effects Manager** (**Figure G-4**).

**NOTE:**

The Karaoke Mode is configured in the **Sound Effect** menu. To access Karaoke configuration settings, click on the **Sound Effect** menu tab.

---

- Sound Effect
- Karaoke Mode
- Equalizer
- Speaker Configuration
- Speaker Test
- S/PDIF-In
- S/PDIF-Out
- Connector Sensing
- HRTF Demo
- Microphone Effect
- General

**NOTE:**

Not all Realtek Sound Effect Managers have all the above listed options. The Sound Effect Manager loaded onto the system may only have some of the options listed above.

---

Below is a brief description of the available configuration options in the **Sound Effects Manager**.

- **Sound Effect:-** Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. To edit the sound effect click **EDIT**.
- **Karaoke Mode:-** The **Karaoke Mode** is accessed in the Sound Effect window.

The **Voice Cancellation** disables the vocal part of the music being played.

The **Key adjustment** up or down arrow icons enables users to define a key that fits a certain vocal range.

- **Equalizer Selection:**- Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.
- **Speaker Configuration:**- Multi-channel speaker settings are configured in this menu. Configurable options include:
  - Headphone
  - Channel mode for stereo speaker output
  - Channel mode for 4 speaker output
  - Channel mode for 5.1 speaker output
  - Synchronize the phonejack switch with speakers settings
- **Speaker Test:**- Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.
- **S/PDIF-In & S/PDIF-Out:**- These functions are currently not supported.
- **Connector Sensing:**- Realtek ALC203 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in, a warning message appears.
- **HRTF Demo:**- Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.
- **Microphone Effect:**- Microphone noise suppression is enabled in this menu.
- **General:**- General information about the installed AC'97 audio configuration utility is listed here.



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## Product Service

### Diagnosis and Debug

CyberResearch, Inc. maintains technical support lines staffed by experienced Applications Engineers and Technicians. There is no charge to call and we will return your call promptly if it is received while our lines are busy. Most problems encountered with data acquisition products can be solved over the phone. Signal connections and programming are the two most common sources of difficulty. CyberResearch support personnel can help you solve these problems, especially if you are prepared for the call.

To ensure your call's overall success and expediency:

- 1) Have the phone close to the PC so you can conveniently and quickly take action that the Applications Engineer might suggest.
- 2) Be prepared to open your PC, remove boards, report back-switch or jumper settings, and possibly change settings before reinstalling the modules.
- 3) Have a volt meter handy to take measurements of the signals you are trying to measure as well as the signals on the board, module, or power supply.
- 4) Isolate problem areas that are not working as you expected.
- 5) Have the source code to the program you are having trouble with available so that preceding and prerequisite modes can be referenced and discussed.
- 6) Have the manual at hand. Also have the product's utility disks and any other relevant disks nearby so programs and version numbers can be checked.

Preparation will facilitate the diagnosis procedure, save you time, and avoid repeated calls. Here are a few preliminary actions you can take before you call which may solve some of the more common problems:

- 1) Check the PC-bus power and any power supply signals.
- 2) Check the voltage level of the signal between SIGNAL HIGH and SIGNAL LOW, or SIGNAL+ and SIGNAL- . It CANNOT exceed the full scale range of the board.
- 3) Check the other boards in your PC or modules on the network for address and interrupt conflicts.
- 4) Refer to the example programs as a baseline for comparing code.

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## Warranty Notice

CyberResearch, Inc. warrants that this equipment as furnished will be free from defects in material and workmanship for a period of one year from the confirmed date of purchase by the original buyer and that upon written notice of any such defect, CyberResearch, Inc. will, at its option, repair or replace the defective item under the terms of this warranty, subject to the provisions and specific exclusions listed herein.

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***Please make sure that the RMA number is prominently displayed on the outside of the box.***

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